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ABSTRACT

A study examined the characteristics and impact of workplace literacy programs in businesses with fewer than 500 employees. Particular emphasis was placed on workplace literacy initiatives in Michigan. Case studies and telephone surveys were conducted to determine the extent of basic skills deficiencies and incidence of workplace literacy programs, attributes of programs and workers who participate in them, and impact of workplace literacy programs. Although between 20% and 40% of hourly employees were found to have some basic skills deficiencies, fewer than 5% of small businesses have a workplace literacy program. The major reasons cited for offering workplace literacy programs were receipt of subsidies and a desire to improve employee well-being, meet customer requirements/improve customer relations, and meet increased competition. Over 20% of firms without programs wanted to initiate one. Workplace literacy programs were found to improve workers' communication and mathematics skills, boost work attitudes and job skills, improve the quality of companies' output, and enhance individual workers' productivity and earnings by 10-20%. It was recommended that federal and state governments provide funding and technical assistance to workplace literacy programs. (Summaries of the 28 Michigan case studies are appended. Also included are 24 tables/figures and 15 references.) (MN)

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CLASSROOMS in the WORKPLACE

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CLASSROOMS in the WORKPLACE

Workplace Literacy Programs in Small and Medium-Sized Firms

Kevin Hollenbeck

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The Author

Kevin Hollenbeck received his Ph.D. in Economics from the University of Wisconsin-Madison in 1976. Formerly a Senior Economist with the National Center for Research in Vocational Education at The Ohio State University, he joined the Upjohn Institute as a Senior Economist in 1989.

He conducts research on the labor market implications of education and training and is currently conducting projects on the school-to-work transition effectiveness of youth apprenticeship programs and postsecondary technical education. He is also working with the State of Minnesota on the evaluation of a welfare-to-work program.

Dr. Hollenbeck has recently published "Postsecondary Education as Triage: Returns to Academic and Technical Programs," in *Economics of Education Review*.

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CLASSROOMS in the WORKPLACE

1
An Introduction to Workplace Literacy Programs

A remarkable phenomenon is occurring in a small number of workplaces across America. It is possible to walk into these firms and find, on premises, classrooms—complete with chalkboards, audiovisual equipment, textbooks, and reference libraries. Furthermore, if you happen to visit one of these classrooms during an instructional period, you are likely to observe a class in reading, writing, or arithmetic. In many of these companies, you would be able to find at least one individual working toward his or her high school diploma or preparing for the General Educational Development (GED) examination. Is this phenomenon like a pebble dropping into an ocean, creating a small ripple that will quickly dissipate? Or is it the beginning of a wave that will gather energy and create an impact that will be widely felt?

This monograph does not predict what the answer to these questions will be, but it does present a systematic, baseline picture of workplace literacy programs. A key emphasis of the monograph is on programs in small and medium-sized businesses (fewer than 500 employees). The monograph is an outgrowth of a study of workplace literacy initiatives in such businesses in Michigan, but much of the material is of a general nature (coming from national databases or from prior literature) and applies to firms of any size and to all workers.

Economists classify the job training given to employed individuals as being either specific or general in nature. Specific training imparts skills and knowledge, which economists refer to as human capital, that would not be transferable outside of the worker's current firm. Learning a firm's system for storing inventory or watching a co-worker operate a piece of equipment that is part of the firm's production process are examples of specific training. General training, on the other hand, comprises human capital that is transferable to other firms and jobs. For example, taking a formal course in computer spreadsheet software or blueprint reading are forms of general training.[1] The workplace liter-

acy programs examined in this monograph are a type of general training. That is, they impart knowledge and skills that are transferable across jobs. The Upjohn Institute study in Michigan defined workplace literacy programs as:

> programs that provide training—separate from regular job activities—in one or more of the following: reading and writing English, mathematics, speaking and understanding English, problem solving, and interpersonal skills. Such a program may take place at the work site, somewhere else, or a combination of both.

The subjects listed in the definition are broad and can be taught at a great many levels of complexity and sophistication. And indeed, the levels of instruction taking place in the workplace vary widely across firms. It might be useful, then, to distinguish between *workplace education* and *workplace literacy*. Workplace education is a broader category that includes workplace literacy. It might be defined as programs provided to employed individuals that offer training, separate from regular job duties, in academic subjects. In site visits to firms, Upjohn Institute project staff observed programs offering instruction in calculus, thermodynamics, physical chemistry, and the Japanese language. The subject matter of these programs places them within the bounds of workplace education, but their complexity extends beyond the notion of workplace literacy.

This study is concerned with programs that offer the more basic levels of instruction defined here as workplace literacy. Whereas literacy connotes reading and writing, the definition used in this study is broader in scope. Considerable public interest is being shown and resources invested in enhancing our national literacy rate (implicitly defined as the proportion of people with adequate reading skills), and a part of that effort is focused on the workplace. However, employers' and workers' needs extend beyond, although they also include, reading and writing to areas of mathematics (including arithmetic computation, measurement, and elementary geometry and statistics), problem solving, communications, and interpersonal skills.

Confining the monograph to workplace literacy programs rather than workplace education is of little practical consequence. The programs observed as part of the Upjohn Institute study and the literature

in the area suggest that workplace literacy comprises most of workplace education.[2]

Workplace literacy programs are often delivered in conjunction with job-specific training. The impetus for the training comes from implementation of a significant change in the workplace. For example, a firm may reorganize its production processes or implement a new technology. In the course of making such changes, employers find that their employees have basic skill deficiencies that retard or block effective implementation. Employers respond to this discovery by initiating a program to upgrade basic skills as necessary. Usually coupled with the skills upgrading is the requisite training to achieve the changes that management started out to implement.

Workplace literacy programs are a relatively new phenomenon. Of course, general job training, and even corporate education programs (see Eurich 1985), have long histories. Adult education and general literacy concerns have similarly been around for several years. However, it is only during the last few years that the workplace literacy programs of interest in this study have arisen.

A confluence of factors may explain why companies are now finding a need to provide instruction in basic skills. First of all, virtual revolutions in transportation and communications have resulted in global competition. U.S. firms, which once had comfortable domestic market shares, now have to compete with both domestic and foreign counterparts. Many firms have responded dramatically to these competitive pressures. Such responses have come to be known as the transformation to "high-performance workplaces" and have been well documented.[3] Firms are investing in technology, reorganizing workforces into self-managed teams, and implementing quality control and just-in-time production processes. These transformations require considerable flexibility and adaptability from workers. Employers are finding that some workers lack the basic skills to make the transition, however. Coincident with increasing competitiveness has been the transition into what has been called the information age. Microprocessors and computers have penetrated virtually every aspect of work—from design to production to support services and provision of management information. Using and coping with computerized operations requires basic literacy and numeracy skills that a significant share of employees simply lack.

On the supply side, another contributing factor to the emergence of workplace literary programs is the declining quality of traditional forms of education. A sizable share of individuals are leaving the educational system with considerable deficiencies in basic skills. For example, over one-third of first-year postsecondary attendees are taking a remedial or developmental course. Another factor that needs to be taken into account is the increasing diversity of the overall labor force. The Latino share of the U.S. population is growing much more rapidly than either the Caucasian or African American shares. Asian and East European populations are also burgeoning. Many individuals from these ethnic groups enter the labor force without English language skills and must be accommodated through training or other means.

In short, employers are faced more and more often with a workforce that lacks the skills to adapt to necessary changes or to understand written or verbal communication. Many have chosen to attack the problem through literacy programs, and it is these programs that are studied here.

Few studies have systematically assessed workplace literacy programs, which is not surprising given their relative infancy. The lack of scholarly examination is particularly true for programs involving small- and medium-sized businesses. This monograph is intended to provide information about these programs and to contribute to an assessment of their effectiveness. Specifically, the monograph uses case study and survey data evidence to address the following questions:

- What is the extent of need for workplace literacy programs? What share of workers have basic skills difficulties? For which specific skills are workers deficient? What are the characteristics of workers with skills difficulties?
- What is the incidence of workplace literacy programs? What proportion of firms offer them? What are the characteristics of firms that offer programs? Why do firms offer programs? What reasons do firms without programs offer for not having them?
- How are workplace literacy programs characterized? How many workers participate in them? What are the characteristics of the workers who participate? Who instructs the programs? What sorts of curriculum and instructional approaches are used? How much do they cost? Where are they offered?

- How effective are workplace literacy programs? To what extent do they improve the basic skills functioning of workers? To what extent do they influence firm-level outcomes? To what extent do they enhance the earnings or job stability of program participants?
- Finally, is there a role for public policy in the encouragement or regulation of such programs? What roles, if any, do the federal, state, and local governments play in facilitating workplace literacy programs? What types of assistance can and should governments offer?

The following chapter addresses the theoretical basis for workplace literacy programs and considers the issue of whether or not public support is warranted. The question of interest is the extent to which employers, employees, or society should bear the cost of such programs. Chapter 3 presents a description of a study undertaken in Michigan that is the source of much of the evidence in the rest of the monograph. The fourth chapter begins to relate the empirical evidence about workplace literacy programs and specifically addresses the need for such programs and their incidence in business and industry. It includes a comparison between firms with programs and those without and examines the motivations governing decisions to offer programs or not. In chapter 5, programs and program participants are described. The chapter includes discussion of curriculum, instructional approach, and cost of offering programs. Chapter 6 turns to evidence about the effectiveness of workplace literacy programs—addressing issues such as the impact on acquisition of basic skills, the impact on workers' attitudes and job performance, and the impact on company outcomes. Finally, chapter 7 contains a summary of key findings and presents policy recommendations.

NOTES

1. The concepts and analysis of specific and general training are attributed to Gary Becker. See Becker (1975). Ehrenberg and Smith (1985) have an excellent exposition of these concepts as well. Note that the concepts of specific and general training are susceptible to two sources of confusion. First of all, employer-provided training is not dichotomous, but rather spans a spectrum from specific to general—in almost all instances, some aspects of training will transfer to other jobs, whereas other aspects will not. Second, training that is intended to develop general human capital, such as the workplace literacy programs studied here, may rely pedagogically on very specific job-related contexts.

2. This situation could change over time. If workplace literacy programs and educational reforms were able to enhance significantly the skills of the future labor force, then employers may turn to higher level general training.

3. See Abt Associates (1992), for example.

2
Workplace Literacy Programs in an Economics Framework

General Principles

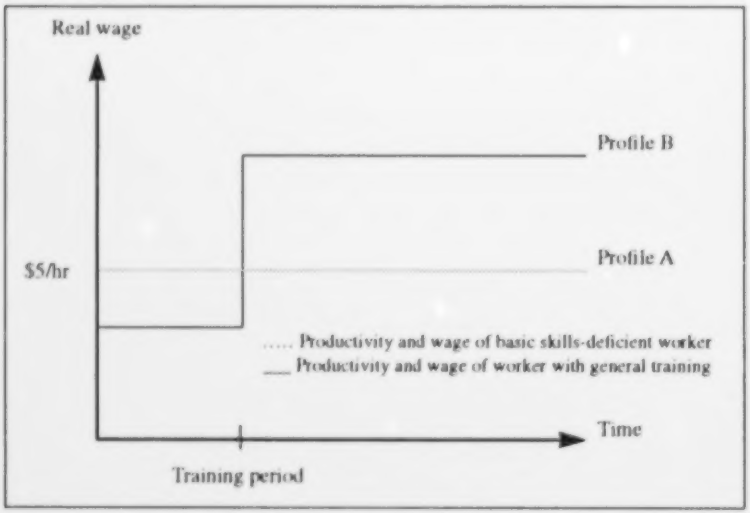
In the general terms of labor economics, employment represents a voluntary exchange in which an employer pays wages to an individual in return for the "right" to a particular quantity of labor services. Once the terms of employment are specified, the means by which the employer combines those labor services with other factors of production are at his or her discretion (within the constraints of law). Employers prudently attempt to match the skill requirements of a job to the skills and knowledge possessed by the worker placed in the job. The smooth functioning of the employment relationship may be jarred, however, if either of two conditions occur. First, employers who are hiring new workers may not be able to find individuals with the requisite skills and knowledge. Second, the dynamics of a work organization may result in new technology or new means of production requiring skills or knowledge that current workers do not possess. One option employers may exercise if they encounter either one of these situations is to enhance the skills of workers through job training.[1]

The distinction between specific and general training becomes important in deciding who pays for the training. In the case of general training, employees must, *in theory*, bear the entire cost of the training. The way the worker "pays" for the training is through lower wages during the training period. Employees must bear the cost because general training improves their productivity in many jobs and hence enhances the wage that they could command in the labor market. If an employer pays for the training and then the worker leaves, the employer loses the training investment.

Figure 2.1 illustrates the wage profile for a worker deficient in basic skills assuming that he or she receives general training and the wage

profile for the same worker without such training. Profile A, which is a horizontal line at a (real) wage of $5/hour, reflects the fact that, without training, this worker's productivity is valued at $5.00 per hour. Profile B shows that this worker's wage (and productivity) could increase substantially with training, but that during the training period, the worker's wage would be somewhat less than that of an otherwise identical worker who is not being trained. In the case of general training, the employer should be *indifferent* about whether or not the worker receives training because he or she is paying the worker at exactly the level of his or her productivity in either case. The worker, on the other hand, should want to be trained as long as the (discounted) value of total future wage enhancements exceeds the forgone wages during the training period.

Figure 2.1 Wage and Productivity Profiles of Basic Skills-Deficient Worker With and Without General Training

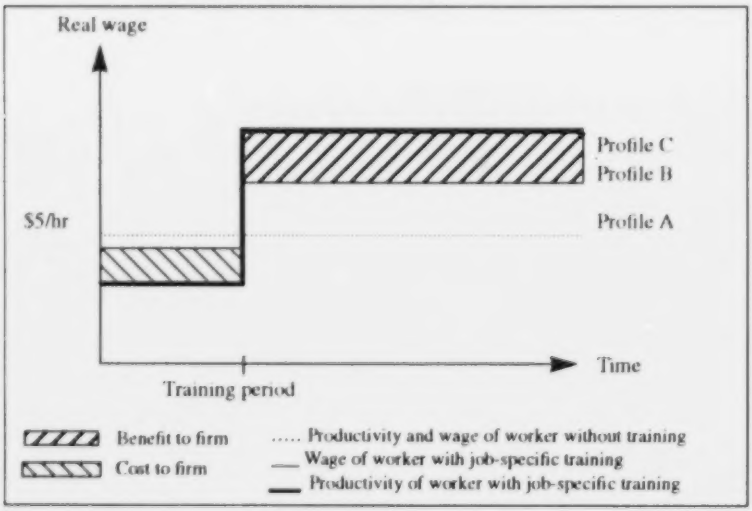


The "financing" of job-specific training is more complex than that of general training. In this case the worker and the employer "share" the cost of training because both parties will receive benefits. As with general training, workers can benefit because they will be more productive after the training and thus earn a higher wage. But because job-specific skills are not portable, employers can also benefit. To reap

their benefit, employers pay trained workers more than the wage for untrained workers, but less than their full productivity would warrant.

Figure 2.2 shows wage and productivity profiles for the specific training scenario. Again, Profile A shows a flat profile for an untrained worker. Profile B shows the wage that the employer would offer to a worker who engages in job-specific training, and Profile C exhibits the worker's productivity. Unlike the general training scenario, here the wage exceeds the worker's productivity during the training period, but after the training period, the wage is less than productivity. Both the worker and the firm "pay" for the training. The worker "pays" by accepting wages that are somewhat lower than those received by workers not being trained; the firm "pays" by giving the worker a wage that is higher than his or her achieved productivity. Both the worker and firm can get a return from specific training. The firm benefits as long as the (discounted) difference between post-training productivity and wages exceeds the cost to the firm, and the worker benefits as long as the post-training wage enhancement, appropriately discounted, exceeds the forgone wages during the training period. Note that in this case, firms have an incentive to train workers.[2]

Figure 2.2 Wage and Productivity Profiles of Worker With and Without Job-Specific Training



Potential Market Flaws

The models presented heuristically in figures 2.1 and 2.2 are rather simplistic. According to the models, workers will engage in and benefit from general training, but employers will be indifferent to it. Workers and firms will share the costs and benefits of specific training. However, these models make a number of strong assumptions that may not hold in reality and may result in flawed decisions about training.

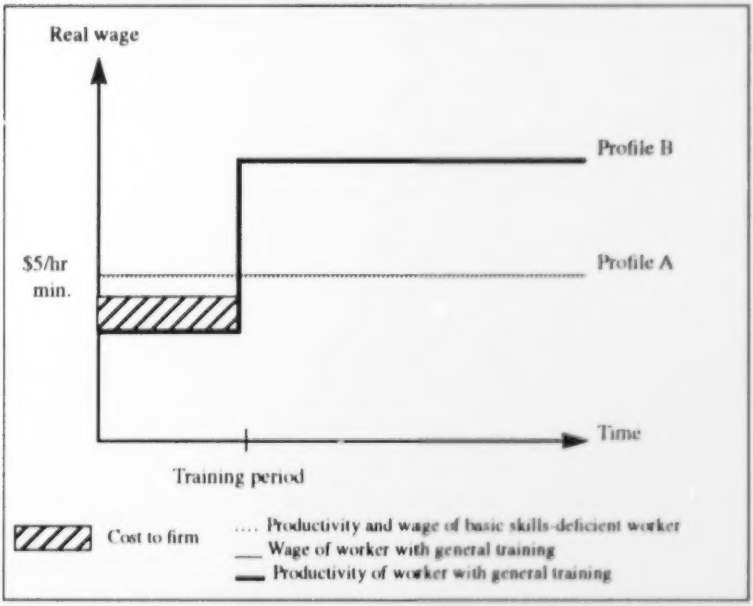
Minimum Wage

One assumption made in the training model is that wages may be reduced during the training period. However, minimum wage laws may eliminate that possibility. Figure 2.3 repeats the general training story, except that here the worker's productivity may drop below the minimum wage during the training period. Since employers cannot lower wage rates below the minimum, they are forced to bear part of the cost of the training, even though they will not be able to reap any benefit. As presented above, employers do not have any incentive to encourage general training, such as workplace literacy programs. In the face of a minimum wage constraint, in fact, employers have a disincentive. They will bear part of the costs of training and receive none of the benefits.

Imperfect Capital Markets

The figures above also abstract from the out-of-pocket costs of providing the training and only portray the forgone productivity costs. In order to bear both of these types of costs (in other words, to invest in human capital), either the worker or firm may need to borrow funds. However, because human capital cannot be used as collateral, it may be difficult to obtain the necessary funds. Sources of capital are particularly likely to avoid lending to individuals or to small businesses, which may be perceived as high risks. This lack of access to capital may result in an underinvestment in training (particularly general training such as workplace literacy programs).

Figure 2.3 Wage and Productivity Profiles of Basic Skills-Deficient Worker With and Without General Training, With Minimum Wage



Information Costs and Uncertainty

The productivity and wage profiles presented in the above figures are also presented as if they are known with certainty by both the worker and firm. But the training decision is made at the far left-hand end of the profiles, and thus both workers and firms face considerable uncertainty about future events at the time the decisions are made. Furthermore, employers may have only vague notions about the costs of training, particularly when a third party is involved—as in the case of workplace literacy programs—and they may have little idea about the effectiveness of the training in terms of raising worker productivity. Evidence presented in a later chapter indicates that many employers profess a lack of knowledge about how to initiate a literacy program.

Again, information costs and uncertainty are most likely to influence smaller firms, which lack the personnel or resources to investigate, initiate, or monitor programs. Furthermore, one source of uncertainty about the payoffs of training lies in the variability of the firm's product market, and smaller firms tend to experience more variance in output than do larger firms.

Scale Economies

The cost of training may differ across the size distribution of firms simply because of economies of scale. In many ways, general training resembles classroom education and is thus less expensive on a per trainee basis when there are more individuals receiving the training. Again, such scale economies will likely work against smaller firms, which are likely to have only a few workers who need training.

The theoretical considerations of specific and general job training thus suggest that there is likely to be a relative paucity of workplace literacy programs. Since these programs are mainly geared toward providing general skills and thus theoretically benefit only the worker, both large and small firms will be indifferent about offering them. If firms feel that they are facing a labor market with an abundance of low-skilled individuals, they may decide to maintain a low-wage, low-skilled workforce rather than "bother with" training and paying higher wages. Furthermore, in light of the minimum wage constraint, firms may actually have a disincentive to offering workplace literacy programs.

Over and above the minimum wage constraint, smaller firms especially are not likely to engage in general training, such as workplace literacy programs, because of inaccessible capital, information costs, uncertainty about the benefits of training, and diseconomies of scale.

Is There a Role for Public Financing?

Public policy could ameliorate many of the potential problems discussed above—minimum wages could be relaxed during training periods, governmental financial guarantees could make capital more accessible, or the government could publicize information about work-

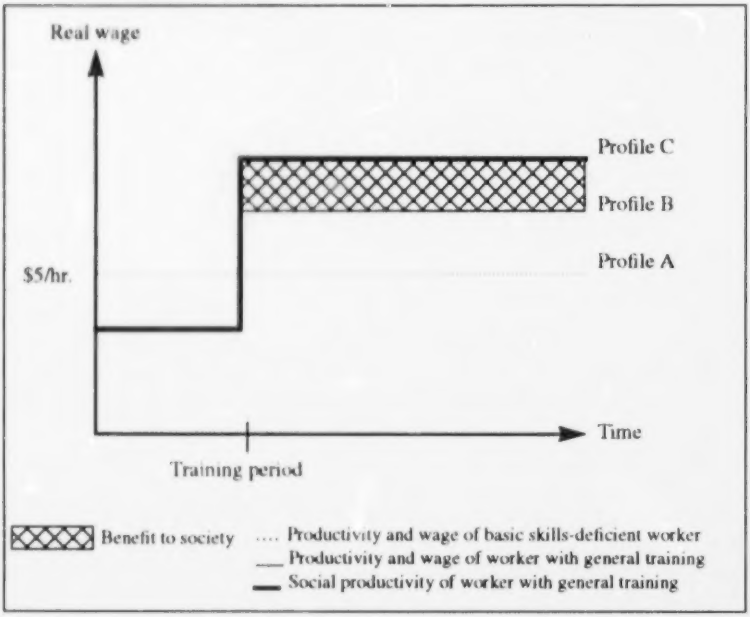
place literacy programs. Apart from these regulatory or information provision activities, however, one might ask whether there is any justification for the government to actively promote workplace literacy programs, by financing them, for example. A case can be made that there is a role for public support.

The main economic justification for government involvement is that worker training provides positive externalities to society. Trained individuals will earn higher wages and thus pay higher taxes, will have more stable attachment to the labor force and thus be less likely to receive income support payments, will have higher levels of skills that will help improve U.S. competitiveness, will be less likely to experience turnover and thus reduce the fixed costs of employment, and will be better informed citizens. Figure 2.4 suggests that these types of externalities can be valued. The social benefits of workplace literacy programs are illustrated by adding a general benefit entitled social productivity, which is added to the worker's benefit after the worker has been trained (Profile C).

The external benefits to training are likely to be inversely related to the specificity of the training. The more job-specific the training, the less likely that society will benefit. (The worker and the firm can capture all the benefits.) However, general training enhances the human capital of workers, which can be applied widely and thus is more likely to benefit society.

To summarize this discussion, workers and society have incentives to promote general training, whereas employers have little incentive to provide the training because of the portability of skills. Furthermore, with the minimum wage setting a floor on wages, employers may have a disincentive to offering general training. Capital inaccessibility, information costs, uncertainty, and scale diseconomies further suggest that smaller firms are particularly unlikely to offer general training. Theory thus predicts a very low incidence of programs, particularly among the small business sector.

Figure 2.4 Wage and Productivity Profiles of Basic Skills-Deficient Worker With and Without General Training, and External Benefits to Society



The next chapter describes a study conducted in Michigan to obtain firm and worker data on workplace literacy programs. These data shed light on the issues just raised about employer and employee motivation and cost-bearing.

NOTES

1. Of course, employers have other options. For example, in the first case they can attempt to expand the bounds of their search to try to find qualified applicants, they can increase the wage offer to entice more qualified candidates, or they can restructure (deskill) the job. In the second case they can shed the current underskilled workers and hire more qualified individuals or they can restructure jobs as well.

2. Hashimoto (1981) presents a model that determines the worker's, and therefore the firm's, share of financing.

3
A Project to Examine Workplace Literacy Programs in Small and Medium-Sized Michigan Firms

Most publicity about workplace literacy focuses on programs in large firms. Much less is known about small business involvement. To overcome this gap, the Southport Institute for Policy Analysis (SIPA) obtained financial support from several foundations to study workplace literacy programs in small and medium-sized businesses. Small and medium-sized businesses were defined as having 500 or fewer employees. The research plan that SIPA followed involved case studies of firms in several states and mail and telephone surveys of a nationally representative sample of firms. The Upjohn Institute was subcontracted to conduct the case studies in Michigan and to analyze the mail and telephone survey data for Michigan firms.

Between May 1991 and July 1992, Upjohn Institute project staff spent one or two days at each of 28 Michigan businesses. At each company, staff interviewed the chief executive officer or his or her designee, human resources manager, training director, two or three supervisors, three to seven employees, a union representative if the firm's workforce was organized, and, if the firm offered a program, the external workplace education coordinator and one or two instructors. Where possible, staff attended actual instructional periods to get a first-hand feel for these programs. In March and April of 1992, over 1,000 small and medium-sized business firms in Michigan were surveyed through the mail or by telephone about their workplace literacy activities, if any.

Case Studies

A major purpose of the Upjohn Institute study was to determine why some small or medium-sized firms, albeit a very small share of such firms, offer a workplace literacy program, whereas most other firms do not. In order to investigate this question, staff conducted site visits in firms with programs and in otherwise similar firms without programs. Specifically, the design of the case study component of the research called for identifying and studying triplets of firms, two of which had a program and one which did not. A triplet was comprised of three firms operating in the same industry and geographic area and employing approximately the same number of individuals. This design would make it possible to compare firms with and without programs while holding constant industry, area, and size of firm. To distinguish between industries, the study was designed to examine a total of seven triplets—five manufacturing sector triplets and two nonmanufacturing sector triplets. This design thus specified 21 case studies. In addition to the case studies, the design specified pretesting the data collection protocols at one firm with a workplace literacy program and one firm without.

Table 3.1 indicates the particular industries and firms within these industries chosen for the pretests and case studies. Employment size and general location of the firms are listed, as well as whether or not the firms operated a workplace literacy program. It was not possible *ex post* to conform precisely to the design specifications. First of all, the case studies imposed a substantial burden on companies that might choose to participate—having project staff on site for a day of interviewing various company personnel—and offered relatively little payoff, so it was difficult to get companies to agree to participate. Second, the incidence of workplace literacy programs is not large,[1] so finding two firms with programs in the same location and industry was difficult. Finally, in a few instances, firms that had agreed to participate canceled their involvement at the last moment. Nevertheless, as the table shows, Institute staff were able to conduct 21 case studies in seven industries (in one industry, only two firms were studied, and in another, four firms were visited).

A second phase of case studies was conducted after the site visits to the firms listed in table 3.1 had been completed. These case studies

Table 3.1 General Characteristics of Pretest and Phase 1 Case Study Firms

Industry (SIC)	Location	Program	Employment size
Pretest firms			
Paperboard Containers and Boxes (265)	Kalamazoo MSA	Yes	173
Plastics Products (3089)	Kalamazoo MSA	No	167
Phase 1 firms			
1. Public Building & Related Furniture (253)	Grand Rapids MSA	Yes	437
	Grand Rapids MSA	Yes	400
	Kalamazoo MSA	Yes	247
2. Plastics Products (3089)	Suburban Detroit	Yes	425
	Grand Rapids MSA	Yes	396
	Suburban Detroit	No	250
3. Fabricated Metal Products (34)	Jackson MSA	Yes	221
	Suburban Detroit	No	79
4. Misc. Machinery, exc. Electrical (359)	Suburban Detroit	Yes	75
	Suburban Detroit	Yes	239
	Suburban Detroit	No	106
5. Electric Lighting & Wiring Equip. (364)	Battle Creek MSA	Yes	325
	Battle Creek MSA	No	398
	Kalamazoo MSA	No	382
6. Hotels, Motels, & Tourist Courts (701)	Northern Lower Peninsula	No	475
	Northern Lower Peninsula	No	200
	Northern Lower Peninsula	No	15
7. Hospitals (8062)	South Central	Yes	607
	Kalamazoo MSA	No	300
	South Central	No	59
	South Central	No	750

examined only firms in the eastern or southeastern part of the state and only firms that had programs. The purpose of these second-phase studies was to observe programs that differed in operating characteristics from those observed in the first phase. In two instances, exemplary programs in large businesses were observed to compare and contrast with programs in small businesses. Table 3.2 lists these additional sites. All together, a total of 28 firms were visited during the two phases of case studies.

Table 3.2 General Characteristics of Phase 2 Case Study Firms

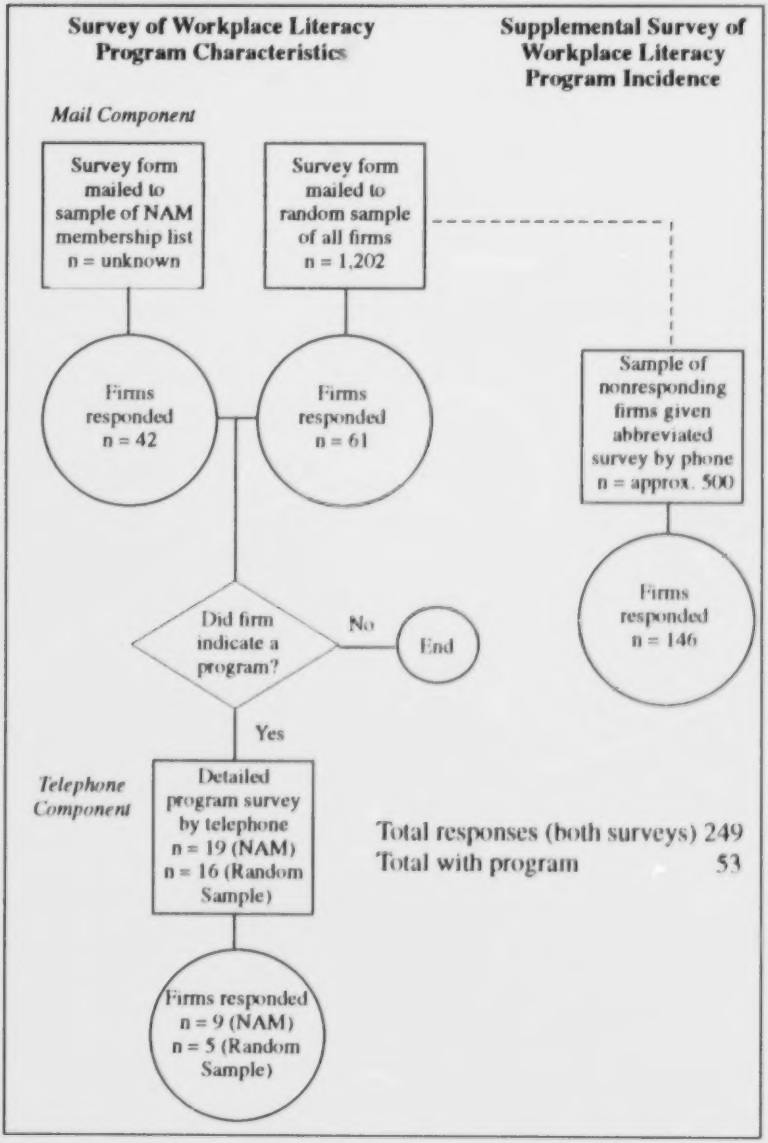
Industry (SIC)	Location	Program	Employment size
1. Plastics Products (3089)	Flint MSA	Yes	187
2. Educational Services (8221)	Detroit MSA	Yes	22,000
3. Transportation Equipment (3714)	Detroit MSA	Yes	1,122
4. Business Services (7389)	Flint MSA	Yes	70
5. Chemicals & Allied Products (2899)	Suburban Detroit	Yes	59

Surveys

The Southport Institute for Policy Analysis designed and conducted a nationally representative sample for its survey of small and medium-sized businesses.[2] Most of the empirical findings concerning workplace literacy programs presented in this monograph come from the Michigan responses to the SIPA survey, which SIPA provided to the Upjohn Institute.[3] The SIPA survey combined mail and telephone survey methodologies and relied on two different sample frames: one from the membership list of the National Association of Manufacturers (NAM) and one from a mailing list supplied by a professional marketing firm.

The overall process that SIPA followed for the survey and summary response statistics for the State of Michigan is illustrated in figure 3.1. As can be seen in that figure, the survey was actually comprised of two separate surveys. The left panel of the figure presents a survey of workplace literacy program characteristics; the right describes a supplemen-

Figure 3.1 Process Followed for Michigan Sample in SIPA Workplace Literacy Program Survey


Survey of Workplace Literacy Program Characteristics
Supplemental Survey of Workplace Literacy Program Incidence
Mail Component
Survey form mailed to sample of NAM membership list n = unknown
Survey form mailed to random sample of all firms n = 1,202
Firms responded n = 42
Firms responded n = 61
Sample of nonresponding firms given abbreviated survey by phone n = approx. 500
Firms responded n = 146
Did firm indicate a program?
No
End
Yes
Telephone Component
Detailed program survey by telephone n = 19 (NAM) n = 16 (Random Sample)
Firms responded n = 9 (NAM) n = 5 (Random Sample)
Total responses (both surveys) 249
Total with program 53

tal survey of program incidence. Part of the sample for the workplace literacy program characteristics survey came from the NAM membership list of firms with fewer than 500 employees. This part of the sample yielded 42 responses from Michigan firms.[4]

In addition to the survey of NAM members, SIPA prepared a nearly identical questionnaire and mailed it to a random sample of firms from the mailing list of a professional marketing organization, excluding agriculture, the extractive industries, and educational and governmental sectors. However, all other sectors of the economy—not just manufacturing—were included. The Michigan sample contained 1,202 firms, which was reduced to 1,123 because documents mailed to 79 respondents were returned as undeliverable. Sixty-one firms (5.4 percent) responded to the initial mailing.

The mail survey from the two sample frames, considered together, yielded 103 responses. Of these, 35 (34 percent) reported that they had a workplace literacy program; 19 of the 35 firms with programs came from the NAM membership, and the remaining 16 came from the random sample of all sectors. SIPA conducted a telephone follow-up survey of the 35 firms to collect detailed information about their programs. The follow-up survey attempted to determine the firm's reasons for starting a program, the characteristics of that program, and outcomes of program. Nine of the 19 firms with programs from the NAM membership responded to the telephone survey, and 5 of the 16 firms from the random sample of firms responded. Given that this follow-up survey effort contains only 14 observations, the resulting data have limited statistical reliability.

The supplemental survey of workplace literacy program incidence (the right panel of figure 3.1) stemmed from a concern that firms either having or considering a program would be more likely to respond to the mail survey. Thus there could be a significant response bias problem in the mailed survey returns. To attempt to gauge the response bias and to build the sample of usable data, SIPA conducted a telephone survey of a sample of firms that did not respond by mail to the workplace literacy program characteristics survey.[5] This survey was an abbreviated version of the original mail survey and collected information on the number of employees at the firm, whether or not the firm had a workplace education program, and, if so, the characteristics of that program. The telephone incidence survey proved successful in

terms of number of responses, adding another 146 responses and bringing the total mail and phone survey responses for the random sample to 207 (18.4 percent of the initial mailing list's entries that were deliverable). Usable survey responses totaled 249 when the responses to the sample drawn from the NAM membership are included.[6]

Table 3.3 presents an industry distribution of the Michigan firms in the random sample survey. As the table indicates, manufacturing firms comprised 42 percent of the sample and yielded slightly more than 50 percent (107/207) of the mail and phone survey responses. Services, which had the next largest share of the mailing list, provided an additional 31 responses (16.2 percent). The majority of the remaining responses were evenly distributed among wholesale trade, retail trade, and finance.

Table 3.3 Industry Distribution of Random Sample and Respondent Firms in Michigan

Industry (SIC)	Total sample[a]	Percent of total	Responses[b]	Response rate
Construction (15..17)	60	5.0	10	16.7
Manufacturing (20..39)	504	41.9	107	21.2
Transportation, communications, and public utilities (41..49)	32	2.7	5	15.6
Wholesale trade (50..51)	95	7.9	19	20.0
Retail trade (52..59)	136	11.3	16	11.8
Finance, insurance, and real estate (60..67)	184	15.3	19	10.3
Services (70..89)	191	15.9	31	16.2
Total	1,202	100.0	207	17.2

a. Includes mailed surveys that were returned as undeliverable.
b. Includes 146 responses from Supplementary Survey of Workplace Literacy Program Incidence.

Whenever possible, the descriptive statistics given in this document combine similar survey questions from the multiple sources to maximize sample size. Furthermore, although the telephone incidence survey was intended to mitigate the nonresponse bias problem, the study does not address the magnitude of this problem and does not attempt to correct for it.

NOTES

1. Estimates of the incidence of workplace education programs are given below.

2. Again, small and medium-sized businesses were defined using the 500 employee criterion.

3. As part of its design, SIPA oversampled Michigan firms and conducted analyses to compare the Michigan responses to national data. In general, the incidence and characteristics of programs were similar. The exception to this was in English as a Second Language (ESL) programs, which were much more prevalent across the nation than in Michigan.

4. Since privacy concerns precluded NAM from releasing membership information to SIPA or to the Upjohn Institute, response rates for this subsample and analyses of responses by industry, location, or size are not available.

5. Note that the sample for the incidence survey came from the sample supplied by the marketing organization. Documentation of the number and characteristics of the percentage of the original sample included in the supplemental study is imprecise, but SIPA estimated that they called approximately half of the mail survey nonrespondents. In Michigan, this translates to a sample size of approximately 500.

6. We refer to the sample drawn from the National Association of Manufacturers mailing list as the *NAM sample* and the sample drawn from the marketing organization list as the *random sample*.

4
Extent of Basic Skills Deficiencies and Incidence of Workplace Literacy Programs

Need for Basic Skills Improvement

The workplace literacy program survey of small and medium-sized business firms provided respondents with the following definition of basic skills and asked them to indicate what share of their workers had difficulties with any of these skills to the point that their work was impeded.

Basic skills are defined as the ability to perform the following skills at the level required by the job:

> reading and writing English, mathematics, speaking and understanding English, participating in problem solving, and interpersonal skills (e.g., effective communication, team building)

Table 4.1 summarizes the perceptions of survey respondents about employee difficulties with basic skills, the importance of basic skills to the performance of the firm, and remedial actions taken to overcome basic skills difficulties.[1]

The two versions of the Workplace Literacy Program Characteristics Survey asked slightly different questions concerning basic skills deficiencies, but in both cases respondents reported that between 25 to 40 percent of hourly workers have some basic skills difficulties. Employers in the random sample report a slightly higher incidence of problems with math, problem solving, and interpersonal skills than with reading and writing. On average, according to the survey responses, 15 to 20 percent of workers have difficulties with reading or writing, whereas 25 percent or more have difficulties with math, problem solving, or interpersonal skills.

Case study experiences suggest that these estimates of basic skill deficiencies may be low. Supervisors frequently gave estimates of

Table 4.1 Basic Skills Difficulties, Importance of Basic Skills, and Actions Taken by Firms

Characteristic	NAM sample	Random sample	Combined sample
Percent of hourly employees with difficulties in:			
Some basic skill	36.7	--	--
English-language skills	20.1	--	--
Mathematics	--	25.7	--
Reading and writing English	--	13.8	--
Speaking and understanding English	--	2.5	--
Problem solving and interpersonal skills	--	23.9	--
Extent of improvement needed in:[a]			
Reading	1.83	1.25	1.52
Writing	2.20	1.49	1.80
Mathematics	2.32	1.66	1.96
Speaking and understanding English	1.21	0.84	1.01
Problem solving	2.48	1.84	2.13
Interpersonal skill	2.26	1.80	2.01
Importance of basic skills for:[b]			
Firm productivity	2.90	2.74	2.82
Profits[c]	2.66	--	--
Domestic competitiveness[c]	2.63	--	--
International competitiveness[c]	2.57	--	--
Percent of firms having taken remedial action because of low basic skills among hourly workers:[d]			
Increased hiring standards	69.0	33.3	49.5
Reorganized jobs	40.5	37.3	38.7
Increased training	85.7	54.9	68.8
Relocated business to area with lower labor cost	2.4	2.0	2.2
Relocated business to area with more skilled workers	0.0	2.0	1.1
Sample size	42	61	103

a. Based on a 4-point scale: 0 = "none"; 1 = "very little"; 2 = "moderate amount"; and 3 = "very much."

b. Based on a 4-point scale: 0 = "not important"; 1 = "not very important"; 2 = "somewhat important"; and 3 = "very important."

c. Question not asked of random sample

d. Firms were asked if in the past two years any of the listed actions were taken because of low basic skills among their hourly workers.

percentage of workers with basic skills deficiencies that were higher than estimates by owners or general managers and/or human resource managers, who tended to be respondents to the SIPA survey. Furthermore, workers were often more aware than managers or supervisors of difficulties with basic skills among their co-workers and even, in some cases, among supervisory personnel. One worker said, "I told my boss that he better start taking these [classes]." Particularly among the hospitals visited for the case studies, top managers tended to be unaware of basic skills deficiencies among lower-skilled workers in departments such as housekeeping and maintenance. Supervisors working closely with these people, however, were well aware of deficiencies and felt strongly that literacy programs had helped or would help them do a better job.

The survey asked employers to rate the extent of improvement needed in various skill areas in addition to the incidence of deficiencies. As the table shows, employers felt that the amount of needed improvement was greatest in problem solving, followed by mathematics and interpersonal skills. Speaking and understanding English and reading were rated lowest in terms of needed improvement. The NAM sample respondents indicated higher levels of needed improvement in all skill areas than did the respondents to the random sample. This may mean that basic skills deficiencies are relatively greater in manufacturing, although it could also be an artifact of higher awareness of the importance of basic skills among manufacturers.

Employers were asked the extent to which basic skills were linked to the economic performance of their firm. On average, they felt that basic skills were *highly* linked to productivity. The basic skills of hourly employees were also important for profit levels and competitiveness, but these relationships were not quite as strong statistically as for productivity. The stronger correlation with productivity may arise because workers are directly responsible for their own productivity, but profits and competitiveness are affected by external factors, such as the actions of other firms.

Case study evidence from service industries, such as hospitals and hotels, somewhat conflicts with the survey findings. Top managers in these industries did not perceive a strong relationship between basic skills of workers and overall productivity of establishments. With a primary focus on training for job-related skills, basic skills were generally

overlooked, and the need for basic skills remediation was considered not important.

The survey found that firms, particularly in manufacturing, have responded to the existence of low basic skills by instituting corporate changes. On average, 50 percent of the respondents have increased their hiring standards; almost 70 percent of the NAM sample respondents have done so. In effect, this response has screened out the problem with new hires. For existing workers, about 40 percent of firms have reorganized jobs to help workers with low basic skills (presumably de-skilling certain jobs) and 69 percent have increased training.

Increased hiring standards were found also in case study firms. Several automotive suppliers expressed a willingness to offer basic skills training to current workers with valued experience and longevity, but they were unwilling to hire new workers lacking basic skills. One Japanese-owned automotive supplier hired temporary workers from a pool of applicants whose basic skills had been certified and gave them further classroom and on-the-job training and trial work experience before permanent employment.

In short, employers report that a substantial share of their hourly workers—25 to 40 percent-—have basic skills difficulties. The incidence of low basic skills seems to be greater in the areas of mathematics, problem solving, and interpersonal skills than in reading and writing. Firms have responded to these deficiencies mainly by increasing training, raising hiring standards, and reorganizing jobs.

Incidence of Workplace Literacy Programs

Despite the magnitude of the problem—25 to 40 percent of all production workers may have basic skills difficulties—only a small minority of firms offer programs of general training. Among small businesses at the national level, Bassi (1992) estimates that 6 to 8 percent of nonmanufacturing firms and 8 to 12 percent of manufacturing firms offer workplace education programs.

In the survey of Michigan small and medium-sized firms, about 23 percent of the respondents indicated that they had offered, sometime

over the past two years, a program that met the following definition.

> A program that provides training—separate from regular job activities—in one or more of the following:
>
> Reading and writing English
> Mathematics
> Speaking and understanding English
> Problem solving
> Interpersonal skills
>
> Such a program may take place at the worksite, somewhere else, or a combination of both.

It is difficult to assess the validity of this estimate of program incidence because of potential survey response bias, as discussed in chapter 3. Furthermore, since a workplace literacy program represents a transaction between employer and employee that does not involve public funding, no centralized data are collected on the subject. Staff experience in investigating and contacting firms for the purpose of conducting the case studies, however, suggests that the 23 percent estimate is high. National estimates of incidence suggest that fewer than 5 percent of small business firms offer workplace education programs (Chisman 1992), and the Institute's project in Michigan did not find any evidence that is inconsistent with that figure. In fact, the incidence is probably more on the order of 1 to 3 percent.[2]

In short, a significant share of the members of the workforce has some basic skills difficulty, but only a minor proportion of them have an opportunity to redress their deficiencies at the workplace.

Reasons for Offering or Not Offering a Workplace Literacy Program

An examination of the mismatch between need for and existence of workplace literacy programs should start with the question of why firms do or do not offer them. The first hypothesis is that need is correlated with the decision to offer a program. That is, firms with greater incidence of basic skills difficulties among their workers tend to have workplace literacy programs. Table 4.2 provides a summary

Table 4.2 Perceptions of Need for Workplace Literacy Programs by Firms With and Without Programs

Attribute	Without program	With program
Percent of hourly employees with difficulties in:[a]		
Some basic skill (NAM sample only)	34.8	40.3
English-language skills (NAM sample only)	13.9	31.0**
Mathematics (random sample only)	26.3	24.3
Reading and writing English (random sample only)	12.4	17.3
Speaking and understanding English (random sample only)	0.9	6.8*
Problem solving and interpersonal skills (random sample only)	20.8	32.5
How much improvement needed:[b]		
Reading	1.4	1.8**
Writing	1.7	2.1**
Mathematics	1.8	2.3**
Speaking and understanding English	1.0	1.1
Problem solving	2.0	2.4**
Interpersonal skills	1.9	2.3
Importance of basic skills for:[c]		
Productivity	2.8	2.9
Profits (NAM sample only)	2.5	2.9*
Domestic competitiveness (NAM sample only)	2.4	2.9**
International competitiveness (NAM sample only)	2.4	2.8**

Percent of firms having taken following actions because of low basic skills among hourly workers:[d]		
Increased hiring standards	45.2	60.0
Reorganized jobs	40.3	36.7
Increased training	53.2	100.0**
Relocated business to area with lower labor cost	3.2	0.0
Relocated business to area with more skilled workers	1.6	0.0

NOTE: Table entries are means for respondents to Survey of Workplace Literacy Program Characteristics (see figure 3.1) with and without programs. As denoted, some items were available only for the NAM sample and some items were available only for the random sample. Because of item nonresponse, the means are calculated over slightly different sample sizes. The maximum sample sizes are 68 firms without a program (23 for NAM sample and 45 for random sample) and 35 firms with a program (19 for NAM sample and 16 for random sample).

*Statistically significant difference between firms with workplace literary programs and those without at the 0.10 level of significance; ** significant difference at the 0.05 level of significance.

a. The first two data items come from the NAM sample, whereas the other four items come from the random sample.

b. Based on a 4-point scale: 0 = "none"; 1 = "very little"; 2 = "moderate amount"; and 3 = "very much."

c. Based on a 4-point scale: 0 = "not at all important"; 1 = "not very important"; 2 = "somewhat important"; and 3 = "very important." Data on profits, domestic and international competitiveness are reported only for NAM sample.

d. Firms were asked if in the past two years any of the listed actions were taken because of low basic skills among hourly workers.

of the self-assessment of firms with and without programs of the proportion of their hourly employees with basic skills difficulties and of the amount of improvement in basic skills needed.

Also, the table provides information on the respondents' assessments of the importance of basic skills to firm performance and the actions firms have taken to address low basic skills among their workforces.

As indicated in table 4.2, firms with programs report a greater incidence of low basic skills and much greater need for improvements. For the firms reported in the NAM sample, the difference in the percentage of hourly workers with some basic skills difficulties between firms with and without a program is not statistically significant. However, firms with a program report a much higher share of employees with inadequate English skills. Responses from the random sample, on the other hand, point to a difference in the percentage of workers with difficulties in problem solving or interpersonal skills and in speaking/understanding English, but no difference in math or reading/writing. Considering all firms in the sample, employers strongly and significantly believe more improvement is needed in all of the basic skill areas, with the exception of speaking and understanding English.

A second hypothesis about the decision to offer programs is that employers who offer programs feel that workers' basic skills are more strongly tied to firm performance than do employers without programs. Indeed, the table shows that employers with programs are more aware of the links between basic skills and productivity, profits, and competitiveness (both domestic and international) than employers without programs. The differences are statistically significant, except for awareness of the link to productivity.

In response to basic skill deficiencies, firms have increased training, presumably by establishing education programs. Firms with programs show no difference from firms without programs in the likelihood of altering hiring practices, reorganizing jobs, or relocating to areas having lower costs or a more highly skilled workforce, however.

As described in chapter 3, SIPA conducted a detailed telephone follow-up survey with a subsample of firms who reported that they had a program. This survey explicitly asked respondents why they started their programs. Table 4.3 presents these data. Since the responses come from a very limited number of firms (n = 14, all in the manufacturing

sector), the data should be construed as indicative rather than confirmatory.

Table 4.3 Responses of Manufacturing Firms as to Why Workplace Literacy Programs Were Started

Item	Response		Percent
	Yes	No	Yes
Is program still operating?	11	3	78.6
Reason for starting program:			
Decrease in workforce skills	9	5	64.3
Employee well-being	12	2	85.7
Error rate too high	8	6	57.1
Increase in competition	9	4	69.2
Labor agreement	0	14	0.0
Preparation for job training (SPC, TQM)	8	6	57.1
Preparation for other training (GED)	8	6	57.1
Problem with absenteeism	2	12	14.3
Safety/health requirements	2	12	14.3
Subsidy became available	4	10	28.6
To improve customer relations	10	4	71.4
To meet customer requirements	10	4	71.4
To prevent loss of contracts	6	8	42.9
To retain workers (n = 13)	8	5	61.5
Other reasons	5	9	35.7

NOTE: Sample comprised of firms responding to telephone follow-up survey of NAM sample and random sample respondents who reported having a workplace literacy program. Sample size = 14.

Among the responses, the item that drew the most agreement from this small sample of employers was that workplace education was offered to improve employee well-being. In other words, employers were motivated to provide it as an employee benefit, as opposed to (or in addition to) a company investment in the human capital of its workers. The next largest set of affirmative responses were for "externally imposed" reasons—to meet customer requirements, to improve customer relations, or because of an increase in competition. Recall that the sample is drawn from the manufacturing sector in Michigan, so it is likely that a number of the firms are suppliers to the automobile industry. An important feature of that industry is the movement by the auto companies toward a policy of purchasing exclusively from certified suppliers. As a result, suppliers have often had to provide basic skills

training for employees in order to implement successful quality upgrade processes to meet customer-required quality standards.

The data presented in the table also suggest that employers acknowledge decreased skills in the workforce and offer literacy programs in order to retain workers. Finally, the educational activities were often instigated in preparation for other, more technical training.

In the case studies, project staff also encountered firms that were in the midst of reorganizing their production processes, instituting total quality approaches, or investing in high technology and had found that employees had certain basic skill deficiencies that obstructed these plans. These firms were forced to initiate basic skills instruction in order to accomplish their reorganization. Few of the case study firms explicitly reported that they were motivated by a concern for the employees' well-being. But in the majority of cases, especially among manufacturers, the firms cited improvement of productivity (profit) and quality of output as the primary reasons for offering workplace education programs.

To summarize, it appears as if firms with a program report a higher incidence of basic skills deficiencies and a higher level of needed improvement in skills than do firms without a program. Again, however, this finding must be treated with caution. First of all, the difference in the percentage of workers with of basic skill difficulties between firms with and without programs is not great. Second, the differences may reflect levels of awareness rather than actual differences. Respondents from firms with programs may be more aware of and alert to basic skills difficulties than respondents from firms without programs. Finally, the effects of the program may interact with responses to these questions. If respondents in firms with a program feel that the program is having a significant impact on skill levels, they may indicate that a lower share of their hourly workforce has difficulties with such skills.

A final source of information about firms' motives was the reasons firms gave for not having a workplace education program. Table 4.4 presents a summary of the responses made by the firms surveyed that did not have a program. These data are difficult to interpret because respondents were asked whether any or all of the 10 reasons listed in the table were factors in the decision not to have a program, and many

employers gave multiple responses.[3] Nevertheless, it appears as if respondents could be classified as follows:

- Have seriously considered the issue and decided not to offer a program because
  - — basic skills are not a problem,
  - — lack of resources (i.e., too expensive, not enough staff, too much release time),
  - — opinions about programs are negative (i.e., not effective, not employer's responsibility, workers quit after training);
- Have somewhat considered the issue, but need more information about
  - — need among workers,
  - — how to set up a program;
- Have never considered the issue.

Table 4.4 Responses of Firms as to Why Workplace Literacy Programs Were Not Started

Reason	Percent yes
Basic skills not serious problem	57.4
Need more information about need	33.8
Need more information how to set up	35.3
Never considered doing so	42.6
Not employer's responsibility	33.8
Not enough staff to manage	51.5
Too expensive	36.8
Too much worker release time	41.2
Workers quit after training	16.2
Workplace education not effective	11.8
Would you like a program?	22.5

NOTE: Question of why program was not started asked of all respondents to Survey of Workplace Literacy Program Characteristics (see figure 3.1) who did not offer a program. Entries to this table are based on the 68 firms that responded to the question (out of 68). Question of would you like to start a program asked of all respondents of telephone survey who did not offer a program. Table entry based on the 182 firms that responded to the question (out of 196).

Approximately one-third of the firms without a program could be classified in the second and third groups combined. These firms responded that they either needed more information or never considered the issue. For the other two-thirds of respondents, the largest number of firms indicated that basic skills were not a problem among their hourly employees. More than half of the firms without programs did

not perceive basic skills to be a serious problem (some of these also indicated that they had never considered the issue or needed more information). The smallest group included employers who had considered the issue but had negative opinions about programs. Finally, a significant share of firms cited resource concerns.

Interestingly, about one-quarter of the firms without programs that responded to the survey indicated that they would like to implement a program. Again the reader should be cautioned about potential response bias because those firms most interested in and knowledgeable about workplace education programs would be most likely to respond to the survey. Nevertheless, it is striking that a significant percentage of firms without programs indicated interest in implementation.[4]

Characteristics of Firms with Workplace Literacy Programs

Another way to gain an understanding about the motivation of firms to offer workplace education programs is to analyze the characteristics of those firms. Tables 4.5 and 4.6 provide summary data characterizing firms that indicated they had had a workplace education program sometime in the past two years and firms without such programs. The first table groups all firms with programs and all firms without programs, whereas the second table classifies firms by whether or not they are in the manufacturing sector.

Data presented in the tables suggest that larger firms (among the small and medium-sized category) are more likely to have workplace education programs; the 60 percent difference in average total employment between firms with and without programs shown in table 4.5 is statistically significant. Table 4.6 indicates that this difference in size holds for both manufacturing firms and nonmanufacturing firms; however, differences are not statistically significant.

Among the case study firms, the median employment size for the firms with programs, excluding the two large businesses that were studied, is 210 employees, which is somewhat larger than the mean number of employees displayed in table 4.5. Unlike those in the survey, the case study firms without programs were larger than firms with

Table 4.5 Characteristics of Firms With and Without Workplace Literacy Programs

Characteristic	Without program	With program
Mean number of employees	84	131**
Part-time employees (%)	18.5	9.9
Female employees (%)	36.0	37.6
Hourly employees (%)	66.8	71.5
Entry level hourly wage ($)	6.54	6.57
Average hourly wage ($)	9.18	9.62
Top hourly wage ($)	12.48	15.35
Benefits:[a]		
Health insurance	84.7	90.0
Sick leave	47.5	53.3
Paid vacations	93.2	93.3
Pension	64.4	86.7**
Training expenditures/payroll (%)	0.8	2.8**
Promotions made internally[b]	2.8	3.1
Turnover[c]	0.5	0.6
Covered by collective bargaining[d]	24.6	22.0
Profits[e]	-0.2	0.0
Reorganization of work index[f]	2.46	3.88**

NOTE: Table entries for all characteristics except reorganization of work index are means for respondents to Survey of Workplace Literacy Program Characteristics (see figure 3.1). Because of item nonresponse, the means are calculated for slightly different sample sizes. The maximum sample sizes are 68 firms without a program and 35 firms with a program. Table entries for the reorganization of work index are means for all respondents of telephone survey. Because of item nonresponse, the means are calculated for 223 firms (out of 249).

**Statistically significant difference between firms with workplace literacy programs and those without at the .05 level of significance.

a. Reported as the percentage of firms that offer each benefit.

b. Based on a 4-point scale: 1 = "rarely"; 2 = "often"; 3 = "usually"; and 4 = "almost always."

c. Based on a 4-point scale: 0 = within the past two years, turnover was "not at all serious"; 1= "not very serious"; 2 = "somewhat serious"; and 3 = "very serious."

d. Indicates the percentage of firms reporting that some or all of their employees are covered by collective bargaining.

e. Based on a 3-point scale: -1 indicates that over the past two years profits have decreased; 0 indicates profits have remained constant; and 1 indicates that profits have increased.

f. The number of activities done by the firm to change how employees do their work from among the following: "Implemented work teams or quality circles," "Began to implement total quality management," "Began profit/gain sharing," "Reduced management layers/oversight," "Increased responsibility for all workers (empowerment)," "Integrated quality control into production (SPC)," or "Implemented just-in-time or computer integrated manufacturing."

Table 4.6 Characteristics of Firms With and Without Workplace Literacy Programs, by Sector

Characteristic	Nonmanufacturing		Manufacturing	
	Without	With	Without	With
Total number of employees	78	163	88	125
Part-time employees (%)	33.3	25.9	7.7	6.6
Female employees (%)	51.5	63.4	24.6	32.2
Hourly employees (%)	68.6	64.9	65.5	72.9
Entry level hourly wage ($)	6.00	7.66	6.88	6.33
Average hourly wage ($)	7.61	12.34*	10.15	9.23
Top hourly wage ($)	11.08	25.93**	13.40	13.42
Benefits:[a]				
Health insurance	68.0	60.0	97.1	96.0
Sick leave	44.0	60.0	50.0	52.0
Paid vacations	88.0	80.0	97.1	96.0
Pension	56.0	100.0*	70.6	84.0
Training expenditures/payroll (%)	0.5	1.7**	1.0	3.0**
Promotions made internally[b]	2.6	3.0	2.9	3.1
Turnover[c]	0.6	0.8	0.4	0.5
Covered by collective bargaining[d]	11.5	0.0	34.3	20.0
Profits[e]	-0.1	0.5	-0.2	-0.1
Reorganization of work index[f]	2.10	2.64	2.72	4.37**

NOTE: Table entries for all characteristics except reorganization of work index are means for respondents to Survey of Workplace Literacy Program Characteristics (see figure 3.1). Because of item nonresponse, the means are calculated for slightly different sample sizes. The maximum sample sizes are 62 firms without a program (36 in manufacturing and 26 in nonmanufacturing) and 31 firms with a program (26 in manufacturing and 5 in nonmanufacturing). Table entries for the reorganization of work index are means for all respondents of telephone survey. Because of item nonresponse, the means are calculated for 223 firms (35 in manufacturing with a program; 101 in manufacturing without a program; 14 in nonmanufacturing with a program; 73 in nonmanufacturing without a program).

*Statistically significant difference between firms with workplace literacy programs and those without, within each sector, at the .10 level of significance; **significant difference at the .05 level of significance.

a. Reported as the percentage of firms that offer each benefit.

b. Based on a 4-point scale: 1 = "rarely"; 2 = "often"; 3 = "usually"; and 4 = "almost always."

c. Based on a 4-point scale: 0 = within the past two years, turnover was "not at all serious"; 1 = "not very serious"; 2 = "somewhat serious"; and 3 = "very serious."

d. Indicates the percentage of firms reporting that some or all of their employees are covered by collective bargaining.

e. Based on a 3-point scale: -1 indicates that over the past two years profits have decreased; 0 indicates profits have remained constant; and 1 indicates that profits have increased.

f. The number of activities done by the firm to change how employees do their work from among the following: "Implemented work teams or quality circles," "Began to implement total quality management," "Began profit/gain sharing," "Reduced management layers/oversight," "Increased responsibility for all workers (empowerment)," "Integrated quality control into production (SPC)," or "Implemented just-in-time or computer integrated manufacturing."

programs (median employment size of 250). However, given the select nature and relatively small number of case study sites without programs, this finding does not strongly refute the finding that programs are much more likely to be found in larger small businesses.

Employers were asked to indicate the percentages of their employees who are part-time, who are female, and who are paid on an hourly basis. The average percentages of female workers and hourly employees were virtually identical for firms with and without programs. Firms with programs, however, had a smaller share of part-time employees, on average—about 10 percent compared to 20 percent for firms without programs. Table 4.6 displays these characteristics by sector and reveals that nonmanufacturing firms tend to have larger percentages of female and part-time workers, but neither sector reflects differences between firms with and without a workplace education program.

Data concerning three measures of hourly wage rates—entry-level wage rate, average wage, and highest wage rate—and four types of fringe benefits were collected in the survey. Table 4.5 shows that the averages for all of these variables were higher for firms with programs than for those without programs, although only one measure—provision of a pension—was statistically significant. In table 4.6, analyses across sectors showed that wage rates and benefits tended to be higher in manufacturing firms than in nonmanufacturing firms,[5] but with few exceptions, there were only minor differences in wages or benefits between firms with or without a program. In fact, entry-level and average hourly wages were about 10 percent higher in manufacturing firms *without* a program than in those firms with a program. The case studies tended to confirm the lack of correlation between wages and benefits, and whether the firm offered workplace education or not.

On the other hand, the ratio of training expenditures to total payroll seems to be related to the presence of a workplace education program. Firms with a program spend three times as much on training (as a ratio to payroll) than firms without. Table 4.6 shows that this relationship holds up within sectors also. The reader is cautioned that the causality between the presence of a program and training expenditures cannot be isolated from these data, however. It may be the case that firms with a program tend to place greater emphasis on training and therefore offer programs. Or it may be that workplace literacy programs increase training expenditures.

Table 4.5 presents evidence that firms with programs are slightly more likely to promote internally and are more profitable; however, these relationships are not significant. Most of the firms included in the case studies followed a policy of internal promotion, and this policy did not seem to have any relationship to the presence of a program.

As might be expected, collective bargaining was more prevalent in the manufacturing sector than the nonmanufacturing sector, and turnover was slightly less in manufacturing. However, within sectors and for the total sample, the tables suggest no difference in collective bargaining coverage or turnover between firms with and without a program. Only a few of the case study firms had collective bargaining contracts, and among small business firms, unions seemed largely disinterested and uninvolved in basic skills training.[6] There was a tendency for unions to want to mask basic skills deficiencies among their members, and general worker assessment was a sensitive issue for firms that offered workplace programs. Turnover was seldom cited as a deterrent to basic skills training by the case study firms. Fear of turnover was not given as a major reason for not offering workplace education.

The last characteristic listed in table 4.5 is an index to measure the extent to which the respondent's firm has engaged in reorganization or restructuring activities. Considerable recent publicity has been accorded activities that firms are pursuing in response to increased domestic and global competition. The characteristics and incidence surveys asked respondents to indicate whether their firm had engaged in any of a battery of seven different activities "to change how their employees do their work." These activities are listed in footnote f of the table. Firms with programs have pursued these activities to a much higher extent than firms without programs—an average of almost four out of the seven activities compared to an average of just about 2.5 out of seven.[7] As can be seen in table 4.6, reorganization activities are being undertaken in manufacturing at a much greater rate than in nonmanufacturing. Again, the average number of activities in firms with programs far exceeds the average number in firms without programs in that sector.

Econometric model of program incidence

To further test for the presence of systematic relationships between the presence of a workplace literacy program and other firm characteristics, I estimated a multivariate model that controls for intervening factors. The dependent variable in this model is a dummy variable set equal to 1 if the firm offered a workplace literacy program and equal to 0 if not. Because of the limited dependent variable, a probit estimation technique was used.

In effect, the model suggests that firms make their decisions about offering workplace literacy programs as follows:

$$(4.1) \qquad WE_i = \begin{cases} 1, \text{ if } Z_i' \geq 0 \\ 0, \text{ if } Z_i' < 0 \end{cases}$$

where $Z_i' = B X_i + e_i$

and

WE_i = a dummy variable set equal to 1, if firm i offers a workplace literacy program and 0, if it does not

X_i = a vector of characteristics describing firm i thought to be related to whether or not firm i offers a program

i = error term

B = estimated parameters

The advantage of this model is that it allows the examination of the effect of a particular firm characteristic on the probability of that firm offering a workplace education program, while holding all other factors constant. Suppose, for example, that average wage levels of small business firms are positively related to employment size. That is, suppose that smaller firms pay lower average wages than larger firms. Further suppose that employment size is an important determinant of whether a firm offers a program, but average wage level is not. Then, in tabular analyses it will appear as though both size and wage level are related to program incidence. But the relationship between incidence and wage levels is spurious, by assumption. A multivariate regression model corrects for this through the estimation of independent effects.

Table 4.7 Estimates from a Multivariate Model of Workplace Literacy Program Incidence

Characteristic	Coefficient	Standard error
Manufacturing (1 = yes; 0 = no)	2.06*	1.23
Nonunion (1 = yes; 0 = no)	2.00***	.78
Need for workplace education		
Index of need for workplace education[a]	.20	.20
Percentage of workers with difficulties	.007	.009
Employment characteristics		
Number of employees	.86***	.30
Percentage women	.00	.01
Compensation		
Average hourly wage	.17*	.10
Number of benefits[b]	.10	.37
Turnover		
Layoffs[c]	.02	.02
Turnover[d]	-.54	.51
Reorganization index[e]	-.10	.20
Profits index[f]	.57	.50
Log-likelihood	-25.57	
Sample size	69	

NOTE: Table entries are coefficients from a probit equation estimated from data from the Survey of Workplace Literacy Program Characteristics (see figure 3.1). Sample size reflects observations lost due to item nonresponse.

*Statistically significant at the .10 level (one-tail); **statistically significant at the .05 level; ***statistically significant at the .01 level.

a. Index created as number of basic skills for which employer responded "very much" to the question, "How much improvement in the following basic skills do you think your hourly employees need?" Ranges from 0 to 6.

b. Number of benefits provided by employer among the following: health insurance, sick leave, paid vacation, and pension.

c. Percentage of hourly employees permanently laid off last year.

d. Based on a 4-point scale, where: 0 = within the past two years, turnover was "not at all serious"; 1 = "not very serious"; 2 = "somewhat serious"; and 3 = "very serious."

e. The number of the following activities done by the firm to change how employees do their work: "Implemented work teams or quality circles," "Began to implement total quality management," "Began profit/gain sharing," "Reduced management layers/oversight," "Increased responsibility for all workers (empowerment)," "Integrated quality control into production (SPC)," or "Implemented just-in-time or computer integrated manufacturing."

f. Based on a 3-point scale, where: -1 indicates that over the past two years profits have decreased, 0 indicates profits have remained constant, and 1 indicates that profits have increased.

Table 4.7 presents empirical estimates of the model presented in equation (4.1). The estimates confirm that being in the manufacturing sector, employment size, and lack of unionization are positively related to the probability of offering a workplace literacy program. The model also suggests that firms paying higher wages are more likely to offer programs, which was only weakly suggested in table 4.5. An interesting result of the multivariate model is that the reorganization of work index is seen to have virtually no systematic relationship to program incidence, which runs counter to the two-way analysis presented in table 4.5 and contrary to Bassi (1992).[2]

Other results shown in the table suggest that there is not a strong relationship between incidence of a program and the level of need for a program (as measured by an index of need and by the percentage of workers with basic skills difficulties) or worker turnover. Thus the multivariate model suggests some counterintuitive findings—neither workplace reorganization nor the basic skills needs of a firm's workforce affect whether the firm offers a program or not. The reader is cautioned, however, that the sample size for these estimates is rather small.

In short, the major differences between firms with and without programs are employment size, expenditures on training, manufacturing or nonmanufacturing status, and possibly unionization status and pursuit of reorganization of work activities. Firms with workplace literacy programs are larger, invest more in training (as measured by the ratio of training expenditures to payroll), are in the manufacturing sector, are nonunionized, and have undertaken more extensive restructuring. Furthermore, firms with programs tend to have higher wages and benefits, to have had better profitability over the last two years, and to promote internally, although these are statistically weaker relationships. Firms with and without programs do not differ in terms of turnover or demographic characteristics of their workforces.

NOTES

1. It bears emphasizing that the survey information is based on respondents' perceptions of basic skills deficiencies and not on formal tests or assessments.

2. The 23 percent estimate stems from response bias and from misreporting. In further analyzing the survey data, we discovered that some firms who reported having conducted a program, in fact, offered quite modest training programs that did not meet the definition.

3. Over 40 percent indicated that they had never considered offering a program but then also indicated several other reasons why they had not offered a program, which seems somewhat inconsistent.

4. Chisman (1992) analyzes the data about firms that "would like a program" more extensively, using the entire SIPA survey.

5. This statement does not seem to hold for nonmanufacturing firms with programs. However, there are only five such firms in the sample, and one of them reported exceptionally high wages.

6. The seeming disinterest in workplace literacy programs from the union officials interviewed in the case studies was a surprise. A number of national initiatives and publications in the area of workplace literacy can be attributed to organized labor. See New York State AFL–CIO (1990); Business Council for Effective Literacy (1987); Sarmiento (1989); and Sarmiento and Kay (1990). It may be the case that union officials in locals at small businesses have less interest in the subject, or it may be that the particular officials who were interviewed in our case studies are not representative of all union officials in small business concerns.

7. Bassi (1992) analyzes this relationship in great detail from national data.

8. This finding requires further consideration. Table 4.5 suggests that workplace reorganization is correlated with having a workplace literacy program, but the regression results suggest that this correlation disappears when other characteristics of the firm are controlled. The contradiction with Bassi's data (1992) is more troubling because she found that workplace reorganization was significant in a regression model. The resolution probably lies in model specification and data. I reestimated equation (4.1) using data from the workplace literacy program incidence telephone survey combined with the characteristics survey data. The former has less information about firms, so the only independent variables used in the reestimation were manufacturing, employment size, and reorganization index. In this model, the reorganization index coefficient was positive and highly significant. Bassi used similar data from a combination of the SIPA's national characteristics and incidence survey. I conclude that workplace reorganization and workplace literacy programs are endogenous; both activities are undertaken in response to external (competitiveness) and internal pressures. The estimates presented in table 4.7 suggest that they tend to occur in manufacturing firms, with larger employment sizes, higher wages, and nonunionized workforces.

5
Attributes of Programs and Workers Who Participate in Them

Attributes of Programs

The concept of workplace education runs counter to traditional notions of education. Traditionally, education occurs before individuals enter the world of work and takes place at schools or postsecondary institutions. Furthermore, the idea of workplace education runs counter to traditional notions of work. Particularly in the small and medium-sized businesses that are the focus of this study, workers are paid in exchange for production; and when they are engaged in literacy programs, they are not directly engaged in production. Thus it is of interest to characterize the curricula and instructional techniques that comprise workplace literacy programs to learn how they are overcoming tradition.

Table 5.1 presents a summary of program characteristics for the 53 Michigan respondents to the combined characteristics and incidence surveys who indicated that they had operated a workplace literacy program within the past two years. The preponderance of these programs (over 80 percent) provided release time (excused absence with pay from normal work duties) to permit employee attendance. An arrangement that some employers followed is to provide release time for part of the activity and expect employees to use their own time for the remainder. The employers perceive this arrangement as a way for employees to "invest" in, or bear part of the cost of, the program themselves.

A similar percentage of programs—over 80 percent—were offered at the worksite. The primary advantages of this arrangement are that its convenience reduces the cost of participation to the worker (minimizes the time and cost of transportation to the activity) and allows the employer to monitor the program. Managers and class partici-

pants at one of the case study firms, on the other hand, strongly endorsed their off-site arrangement because it minimized disturbances and thus promoted attendance and concentration.

Table 5.1 Characteristics of Workplace Literacy Programs in Michigan Firms

Characteristic	Number of firms	Percent[a]
Voluntary participation	29	56.9
Taught at worksite	42	82.4
Class frequency (mean)[b]	1.8	
Release time provided	42	80.8
Skills taught:		
Mathematics	30	58.8
ESL	2	3.9
Reading and writing	19	38.0
Standard GED curriculum	10	19.6
Problem solving	42	82.4
Interpersonal skills	34	66.7
Type of instructor:		
In-house paid teacher	15	44.1
Contracted teacher	7	20.6
Company volunteer	4	11.8
Community college teacher	1	2.9
Adult education teacher	3	8.8
Private consultant	1	2.9
Technical school instructor	1	2.9
Other	2	5.9
Sample size	53	

a. Percentages are based on respondents to the item and not on total with a program.
b. Based on a 5-point scale: 0 = "not regularly scheduled"; 1 = "less than once a week"; 2 = "once a week"; 3 = "2 times a week"; 4 = "3–4 times a week." Firms that did not know the class frequency were excluded from the calculation of the mean.

Slightly over half of the programs were voluntary; the remainder were either mandatory for certain workers or a combination of mandatory and voluntary. A plurality of the programs were not regularly scheduled (met as needed or as could be arranged), but among those scheduled on a regular basis, the median frequency of meeting times was about twice per week.

The responses were almost perfectly split between using an in-house employee as the instructor (in almost all cases on a paid basis) and bringing in an external party as the instructor.[1] In the second

case, instructors were either independent consultants or taught at a community college or in the adult education department of a public school system. Most of the case study firms made use of external instructors. Only 3 of the 16 case study firms that had a program were using employees of the firm as instructors.

The skills that were taught matched the areas of greatest need, according to the survey data. Problem solving was taught in almost 85 percent of the programs; interpersonal skills in about 70 percent of the programs; mathematics in over half of the programs; and reading, writing, or other English skills in a minority of the programs. In contrast to the survey responses, over three-quarters of the case study firms included math in their program, and over three-quarters included reading and writing. Contrary to the survey responses, only a few of the programs observed formally included interpersonal skills or problem solving.

The program characteristics across the manufacturing and nonmanufacturing sectors, examined in table 5.2, indicate few significant differences. Perhaps the most interesting difference lies in the area of skills taught. Mathematics was covered in almost three-quarters of the programs offered by manufacturing firms, but in only about one-fifth of the programs offered by nonmanufacturing firms. This undoubtedly reflects the more technical nature of the work in the manufacturing sector. In nonmanufacturing firms (mostly service firms), there is more interest in problem solving and interpersonal skills, according to the survey. This probably reflects the service sector's customer orientation. Interestingly, many of the programs in manufacturing also trained for interpersonal skills. One reason for this emphasis may be to facilitate reorganizational initiatives toward the utilization of self-managed teams. Note also that manufacturing firms were more likely to sponsor GED courses.

The small sample of telephone follow-up survey data provides information concerning instructional strategies operative in programs. Table 5.3 presents the data concerning instruction from that follow-up. Again the reader is cautioned that these data come from an extremely small and select sample. Note that all 14 responses were from the manufacturing sector. In general, the planning of these courses did not involve employees. In a majority of firms (8), employees played no role in program initiation or design, and in all

Table 5.2 Characteristics of Workplace Literacy Programs in Michigan Firms, by Sector

Characteristic	Nonmanufacturing	Percent[a]	Manufacturing	Percent[a]
Voluntary participation	9	60.0	20	55.6
Taught at worksite	12	80.0	30	83.3
Class frequency (mean)[b]	1.7		1.9	
Release time provided	13	86.7	29	78.4
Skills taught:				
Mathematics	3	21.4	27	73.0**
ESL	1	6.7	1	2.8
Reading and writing	5	35.7	14	38.9
Standard GED curriculum	0	0.0	10	27.0**
Problem solving	13	92.9	29	78.4
Interpersonal skills	11	73.3	23	63.9
Type of instructor:				
In-house paid teacher	7	77.8	8	32.0
Contracted teacher	1	11.1	6	24.0
Company volunteer	0	0.0	4	16.0
Community college teacher	0	0.0	1	4.0
Adult education teacher	0	0.0	3	12.0
Private consultant	0	0.0	1	4.0
Technical school instructor	0	0.0	1	4.0
Other	1	11.1	1	4.0
Sample size	15		38	

**Statistically signifiant difference between nonmanufacturing and manufacturing firms at the .05 level of significance.

a. Percentages are based on respondents to the item and not on total with a program.

b. Based on a 5-point scale: 0 = "not regularly scheduled"; 1 = "less than once a week"; 2 = "once a week"; 3 = "2 times a week"; 4 = "3–4 times a week." Firms that did not know the class frequency were excluded from the calculation of the mean.

of the other responding firms, employees had just a small role. Low employee involvement was also found to be true in the case studies, at least in the implementation and planning of the program. However, in most of the case study programs, participants had a great deal of influence on course content because the instructors tended to customize each class to the needs of the participants.

According to the follow-up survey data, programs were highly accessible to employees. The table shows that 10 programs were available to all hourly employees (the rest only to selected employees), and on average, nearly 60 percent of the firms' hourly workforces had participated or were participating. Case study findings about eligibility and participation were mixed. In some cases, the programs were for hourly workers only, and in others all employees were eligible. Some firms had mandated participation, but in others participation was entirely voluntary. Voluntary participants were a low percentage of the workforce, but they were a highly motivated and enthusiastic few.

Over 75 percent of the programs were held partially or completely during working hours, and firms provided an average of 8.9 hours per week of release time; employees contributed another 3.7 hours of their own time, with three firms indicating that such time was reimbursed by the company. Project staff paid considerable attention to the issues concerning release time in the case studies. Some of the case study firms offered release time to all participants; others to none. Employers and workplace education providers generally agreed that release time was important for ensuring the success of a program. A notable exception was a very large firm's program, which seemed to achieve a high level of success with no release time given.

In some cases where the firm's policy was to give release time, the policy was not supported at the line supervisor's level, where production goals had to be met, and conflicts arose between supervisors and workers who wanted to leave to attend class. In other cases, particularly when management was thoroughly committed to the program, supervisors indicated that they could easily "plan around" the needed release time. The practice of giving participants 50 percent "company time" in exchange for 50 percent of their "own time" in class seemed to work well, although one firm's participants reported high absenteeism during the hour of class held during the employees' own time.

Table 5.3 Detailed Characteristics of Workplace Literacy Programs in Michigan Firms

Characteristic	Number of firms in follow-up survey with characteristic	Percent[a]
Manufacturing sector	14	100.0
Participation		
Available to all hourly employees	10	71.4
Average percent of workforce participation[b]	n.a.	59.5
Time Scheduled and Release Time		
Instruction partially/completely during work hours	11	78.6
Average hours of release time per week[c]	n.a.	8.9
Average hours of own time per week[d]	n.a.	3.7
Overtime reimbursed by firm	3	37.5
Employee involvement in design		
Employees had no role in program initiation/ design	8	57.1
Employees had small role in program initiation/ design	6	42.9
Employees had moderate/significant role in program initiation/design	0	0.0
Skills taught		
Only skills specific to work	1	7.1
Only general education skills	5	35.7
Both general and work-specific skills	8	57.1
English as second language (ESL)	0	0.0
Instructional method		
Individual tutoring	0	0.0
Group instruction	8	57.1
Individual and group instruction	6	42.9
Materials		
Computer-assisted instruction	6	46.9
Commercially published workbooks and lessons	9	64.3
GED/ABE curriculum materials	3	23.1
Program Duration		
Unlimited duration	6	46.2
Limited duration, fixed length	7	53.8
Limited duration, competency-based	0	0.0

Assessment/evaluation		
Tests of learning gains	9	69.2
Instructor reports of learning gains	7	50.0
Workplace performance evaluation	6	42.9
Internal observations	11	78.6
Cost/benefit analysis	2	14.3
Firm Involvement		
Incentive promised for program completion	0	0.0
Established learning goals	4	28.6
Established work performance goals	3	21.4
Sample size	14	

n.a. Statistic is not applicable.
a. Percentages are based on respondents to the item and not on total with a program.
b. Sample size is 13.
c. Sample size is 7.
d. Sample size is 6.

In both the case study firms and the firms that responded to the follow-up survey, group instruction was the norm. In the survey data it occurred in about 60 percent of the programs, with the other 6 out of 14 respondents indicating that the program involved a combination of individual and group instruction. Computer-assisted instruction occurred in 6 out of 14 programs. Instructional materials included commercially published workbooks in 9 out of 14 cases and special materials developed by the firm in 8 out of 14 cases. No firm in the follow-up survey sample indicated that English as a Second Language (ESL) was taught. Among the case study firms, 3 of the 16 programs included some ESL training. The relatively low incidence of ESL programs among the firms observed occurred because the case study firms tended to be located in areas with very few non-native English-language workers.

Only one firm in the follow-up survey indicated that it delivered training solely in work-specific skills. Most programs taught both general education and work-specific skills. Most of the case study programs covered both general and job-specific skills as well, and instructors usually attempted to use materials from the workplace as pedagogical examples.

No respondent to the survey reported promising employees incentives for completing their program, and few established learning or work performance goals.[2] Individual learning gains or other program results were, however, evaluated through a variety of mechanisms. Eleven out of 14 firms used informal observations to evaluate results. In addition, around half of the firms used formal tests of learning gains, instructor reports of learning gains, or workplace performance evaluations.

Program Costs

An important aspect of programs is the financial cost borne by the employers. Most employers report bearing at least part of the cost. Over 92 percent of the firms with programs indicated that they provided some financial support to their programs. As a general rule, the costs that firms bear are quite modest. Table 5.4 provides information from the small telephone follow-up survey of 14 respondents with programs concerning financial arrangements. In these data, the mean out-of-pocket expense over the last year for programs was $14,525, with a range from $0 to $50,000. Costs included payments to instructors, release time for employees, and costs of materials and facilities. These amounts may reflect an underestimation of the total cost, since most firms operate their programs in partnership with an educational institution, and usually that institution bears fixed costs such as curriculum development. Furthermore, the federal government will subsidize, from Adult Education Act funds, the basic skills instructional costs of an individual aged 16 and over who has not completed high school or its equivalent. On the other hand, the reported amounts may be an overestimate of costs to operate a program because they may include one-time remodeling and refurbishing costs associated with providing space for workplace education activities.

The table shows that eight firms (slightly more than half) reported receiving some kind of support for the program, either from the state or from a local educational institution, to help underwrite the cost. Four of the eight firms indicated that they had planned to start the program before receiving any support. The benefits derived from the

external support were that the program was implemented sooner than it otherwise would have been (five out of seven responses) or that a better program was created (four out of seven). The case study evidence showed a much stronger reliance on financial assistance. Most of the case study firms received some form of financial aid. Only two of the case study firms with programs received no aid at all. In most of the other 14 cases, the programs would never have been started if aid were not available. Our judgment is that a few firms with programs would continue them without subsidies or aid but the majority probably would not.

Table 5.4 Financial Characteristics of Workplace Literacy Programs in Michigan Firms

Characteristic	Number of firms with characteristic	Percent[a]
Firm provided some financial support to program[b]	49	92.5
Cost to firm (mean)[c]	n.a.	$14,525
Received external financial support for program[d]	8	66.7
If received support:		
Planned to start program before support	4	57.1
Received support prior to program	4	57.1
Support led to earlier implementation	5	71.4
Support improved quality	4	57.1
Still receiving	1	14.3
Thinks benefits of program exceed costs	12	92.3
Sample size	14	

n.a. Statistic is not applicable.
a. Percentages are based on respondents to the item and not on total with a program.
b. Sample size is 52.
c. Sample size is 12.
d. Kinds of support included: grants, free use of equipment, free services of a teacher, free instructional materials, free testing of workers, tax credit for training, program design help, and other.

Although only two firms reported undertaking a cost-benefit analysis to evaluate results of the program, nearly all firms believed the benefits paid for the costs of the program. None of the case study firms had conducted any sort of cost-benefit analysis or even rudimentary rate-of-return analysis. In most cases, employers simply do not know how to go about measuring the benefits, although sometimes they have measurement systems that could potentially be tapped for estimating productivity effects. Usually firms with workplace literacy programs are concurrently implementing other parallel

efforts to improve productivity, and it would be difficult to isolate the benefit of workplace education. Nearly all the case study firms believed the benefits paid for the cost of the program, as did the survey respondents, but in many cases firms were doubtful or uncertain whether they would be able to continue the program without a subsidy.

A Model of Program Operating Characteristics

Chisman's book, *The Missing Link* (1992), provides a very good summary of the operating characteristics of programs, and I paraphrase his model here. His synopsis is that employers and providers have generally overcome considerable obstacles to develop programs that are generally working. Financial and staffing resources are obstacles. The lack of availability of and access to assessment instruments, curricula, and instructional materials are obstacles. Worker distrust and suspicion are obstacles.

Chisman suggests that as employers and providers have overcome these obstacles, they have devised programs that fit into one of three types. *Low-intensity programs*, the most common type, are the least complex, although they may be of significant duration. With relatively low levels of management involvement, these programs may involve peer tutoring among a relatively small number of workers or inviting local adult education agencies to offer standard ABE or GED preparation classes on the premises (with or without release time), again to a relatively small number of workers. Whereas they may be less sophisticated than other types of programs, low-intensity programs may still be quite significant to a company and its workers. In other cases, however, they may be merely a minor fringe benefit.

Quick fix programs are typically more complex and involve more employees than their low-intensity program counterparts, but they are also of shorter duration. They are intended to address a particularly acute skill shortage that has been identified by a company, usually in the process of a major restructuring activity, such as the implementation of statistical process control (SPC). Typically, management has a great deal of interest in the underlying restructuring activity, and thus a great deal of interest in the workplace literacy program that has been identified as an important adjunct. A nice aspect

about quick fix programs is that they can be "evaluated." Either workers "get up to speed" or they do not. Quick fix programs may be criticized because of their limited objectives and their ulterior intent, but to their credit they may lead to other quick fix programs and open significant lines of communication between management and workers.

The final, and least common, type of program is a *lifelong learning program*. This type of program has the highest level of complexity and is of the longest duration. Employers do not generally set out to support lifelong educational goals; more typically, one successful quick fix or low-intensity program will lead to a much expanded menu. Lifelong learning programs involve more general education than quick fix programs but are almost always job-related to some extent. Such programs become a fixture in the corporate culture and often involve a specific facility or "learning center."

Characteristics of Program Participants

The case studies and telephone surveys that comprised the Michigan study did not collect systematic data concerning participants in workplace literacy programs. However, the U.S. Department of Education sponsored a survey of households across the country that provides enough information to give a national profile of participants. The National Household Education Survey (NHES) collected data about two general subjects—early childhood education and adult education—from a random sample of the U.S. noninstitutionalized population. It represents one of the first efforts of the U.S. Department of Education to collect education data through a random sample of households rather than from students, teachers, or administrators. The purpose of the adult education component of the NHES was "to measure participation in adult education activities, to describe those activities, to provide data on the characteristics of participants and nonparticipants, and to determine why some adults participate while others do not" (Brick et al. 1992, p. 3).

For each individual who participated in higher or postsecondary technical education on a part-time basis or who participated in adult

education, the NHES collected detailed information on up to four courses. The data set contains information on 12,568 individuals and 17,612 courses.[3]

To identify participants in adult education, the survey asked individuals whether they had participated in any of the following activities during the previous 12 months[4]:

- Continuing education courses or noncredit courses
- Courses by mail, television, radio or newspaper
- Private instruction or tutoring
- Educational or training activities given by an employer, labor organization, neighborhood center, church, or community group
- Instruction in basic skills such as math, or reading and writing English
- Instruction in English as a Second Language
- Any other organized educational activity

Respondents were asked for their *main* reason for taking up to four courses. The choices they were given were as follows:

- A personal, family, or social reason
- To improve, advance, or keep up to date on current job
- To train for a new job or a new career
- To improve basic reading, writing, or math skills
- To meet a requirement for a diploma, degree, or certificate of completion
- Other reason

In addition, if their main reason for taking a course was not job- or career-related, respondents were asked whether they also had employment- or career-related reasons for taking it.

For purposes of analysis, an individual was considered to have participated in a workplace literacy program if he or she had engaged in "instruction in basic skills such as math or reading and writing English" *or* "instruction in English as a Second Language," *and* they had taken at least one course either "to improve, advance, or keep up on current job" or "to improve basic reading, writing, or math skills" and they had employment- or career-related reasons for taking the course.[5]

According to the NHES, approximately 1.73 million persons participated in a program in the U.S. in 1990, which is just under 1 percent of the total population aged 16–80. Table 5.5 provides summary data about these individuals.[6] For each of the characteristics presented in the table, the first column indicates the (weighted) number of program participants with that particular characteristic. The second column of numbers presents the percentage distribution of participants across the various categories of the characteristic. The third column presents the distribution for the entire population. By comparing the last two columns, it is possible to determine which characteristics seem to be related to participation. If the second column is larger than the third column (e.g., males), then this characteristic is positively related to participation in workplace education. The last column reports a chi-square for testing the statistical significance of differences across attributes.

More workplace literacy program participants were men than women, by a small margin, even though the population distribution favors women. The difference does not attain statistical significance, however. Whereas the majority of participants were white, minorities were overrepresented among participants relative to their share of the population. Hispanics, in particular, had the highest population share of participants. This probably reflects a relatively high participation in ESL programs. Consistent with the relatively high participation rates of Hispanics, the West census region has the highest participation rate of any area of the country. (The Northeast had the lowest rate.)

It is interesting that workplace literacy program participants are not among the educationally or economically disadvantaged. The largest relative share of participants reported their highest level of education as between a high school and college degree.[7] Persons with a high school degree or less were far less likely to participate. Similarly, among family income classes, the largest relative share of participants came from the upper middle part of the distribution—family incomes between $15,000 and $20,000 per year and between $30,000 and $75,000 per year. Except for the highest income class, the smallest relative share of participants had incomes of less than $10,000 per year.[8]

Table 5.5 Characteristics of Workplace Literacy Program Participants in U.S.

Characteristic	Weighted number of participants (000s)	Percentage	U.S. population percentage	χ^2 (df)
Total	1,727.2			1.80 (1)
Sex				
Female	841.5	48.7	54.8	
Male	885.8	51.3	45.2	
Race/ethnicity				42.98*** (3)
Black	328.2	19.0	11.1	
Hispanic	357.8	20.7	7.6	
White	966.4	56.0	78.7	
Other	75.0	4.3	2.6	
Years of education				23.27*** (6)
Up to 8th	60.9	3.5	5.6	
9th–11th	139.6	8.1	9.8	
High school diploma or equiv.	529.6	30.7	36.9	
Voc/tech after H.S.	89.6	5.2	3.8	
1–4 years college, no degree	631.4	36.6	20.2	
Associate's degree	63.1	3.7	2.8	
Bachelor's degree or more	213.4	12.4	20.9	
Census region				3.46 (3)
Northeast	275.4	16.0	20.9	
Midwest	423.0	24.5	24.1	
South	567.2	32.8	34.2	
West	462.6	26.7	20.8	
Household income level				10.77 (8)
< $10,000	182.4	10.6	15.1	
$10,001–$15,000	130.3	7.5	8.6	
$15,001–$20,000	221.2	12.8	8.9	
$20,001–$25,000	133.5	7.7	8.9	
$25,001–$30,000	150.2	8.7	9.9	
$30,001–$40,000	317.7	18.4	14.4	
$40,001–$50,000	271.9	15.7	11.7	
$50,001–$75,000	250.7	14.5	13.5	
$75,001 +	69.5	4.0	9.2	

SOURCE: Author's tabulation of U.S. Department of Education, National Household Education Survey.

***Statistically significant at the .01 level.

Table 5.6 Industry and Occupation of Workplace Literacy Program Participants in U.S.

Characteristic	Weighted number of participants (000s)	Percentage	Percentage of U.S. labor force
Industry			
Agriculture, forestry, fishing	9.1	0.6	3.2
Mining	0.0	0.0	0.8
Construction	121.7	7.4	4.6
Manufacturing	383.5	23.3	17.2
Transportation & public utilities	63.9	3.9	6.4
Wholesale trade	56.4	3.4	1.7
Retail trade	194.5	11.8	15.4
Finance, insurance & real estate	129.0	7.8	5.9
Services	439.4	26.7	33.4
Public administration	247.2	15.0	11.4
Occupation			
Executive, admin., manager	120.0	7.2	4.6
Professional & technical	77.3	4.6	12.1
Health technicians	106.4	6.4	3.8
Engineering-related	25.6	1.5	1.0
Marketing & sales	148.0	8.8	11.6
Admin. support/clerical	474.9	28.3	25.4
Service occupations	256.6	15.3	16.6
Ag-related	0.0	0.0	2.6
Mechanics/repairers	46.0	2.7	3.0
Construction/mining occupations	78.8	4.7	3.5
Precision production	80.1	4.8	1.4
Labor & material handlers	262.3	15.7	14.4

SOURCE: Author's tabulations of U.S. Department of Education, National Household Education Survey.

The case studies and SIPA surveys in Michigan found that workplace literacy programs are more prevalent in manufacturing than nonmanufacturing industries. The NHES data, collected from the self-reports of workers, confirmed this finding. Table 5.6 shows that the manufacturing sector accounts for about 17 percent of the total labor force, but over 23 percent of the participants. Although it is not shown separately in the table, the transportation equipment (automobile manufacturing) industry had the highest relative proportion of program participants within the entire manufacturing sector. Other industries that had relatively high shares of participants included construction; wholesale trade; finance, insurance, and real estate; and public administration.

Among occupational groupings, the broad classes with a larger than average share of participants according to the NHES data were health technicians, administrative support/clerical, precision production workers, and laborers and material handlers. Inexplicably, the executive, administrative, and managerial occupational class also had a relatively high proportion of participants.

A Model of Participation in a Workplace Literacy Program

In addition to the tabular analyses of participation in workplace education using data from the NHES, I estimated a multivariate participation model at the individual level. This model parallels the empirical model of firm participation behavior presented in chapter 4. In particular, I assume that individual j participates in workplace education if an (unobserved) indicator that is systematically related to j's characteristics exceeds a critical value.[9] Equation (5.1) presents this model. The dependent variable is the probability of participating in a workplace literacy program, which is proxied empirically by a dummy variable set equal to 1 if the individual participates in a program and equal to 0, if not.

Table 5.7 Probit Estimates from a Model of Individual Participation in a Workplace Literacy Program

	Males		Females	
Characteristic[a]	Coefficient	Standard error	Coefficient	Standard error
Race/ethnicity (white)				
Black	.05	.21	.36**	.15
Hispanic	.64***	.16	.24	.19
Other nonwhite	.48*	.26	.03	.36
Married	-.06	.15	.01	.13
Children < 16[b]	.22	.14	.07	.13
Education (< 12 years)				
H.S. diploma	-.02	.19	-.01	.19
Some college	.41**	.18	.21	.20
College grad	.09	.25	-.19	.27
Years of education	-.03	.04	.00	.04
Urban	-.10	.14	.22	.16
West	-.19	.14	.26**	.13
Age (< 30)				
31–45	-.14	.14	.11	.13
46 +	-.27	.17	-.10	.18
Manufacturing	.27**	.12	.15	.17
Sample size	4,681		5,081	
Log-likelihood	-269.18		-258.76	

SOURCE: Author's probit regression estimates of data from U.S. Department of Education, National Household Education Survey

* statistically significant at the .10 level; **statistically significant at the .05 level; ***statistically significant at the .01 level.

a. For categorical variables, the omitted class is in parentheses.

b. Variable is defined as presence of children younger than 16.

$$(5.1) \qquad \text{PART}_j = \begin{cases} 1, \text{ if } I_j' \geq 0 \\ 0, \text{ if } I_j' < 0 \end{cases}$$

where $I_j' = B X_j + e_j$

PART_j = a dummy variable set equal to 1, if individual j participates in a workplace literacy program and 0, if he or she doesn't

X_j = vector of characteristics describing individual j thought to be related to whether or not he or she participates in a program

e_j = error term

B = estimated parameters

Table 5.7 presents the results of estimating this model separately by sex using probit estimation techniques. The individual characteristics most consistently related to workplace literacy program participation are, for men, working in the manufacturing sector, having some college (defined as 1–4 years of college without attaining either an associate's degree or a bachelor's degree), and being of Hispanic ethnicity or other racial background that is nonwhite and non–African American. For women, the only characteristics systematically related to participation are residing in the West census region and being African American.

NOTES

1. Adult education professionals might be skeptical about calling an in-house employee an instructor, and it may be debatable as to whether such a program should be classified as a workplace literacy program. In the case studies, there were a few instances where we observed an in-house staffperson in the role of instructor. In all such cases, these individuals had participated in additional training in the subject matter prior to teaching other employees and always exhibited pedagogical concerns such as organization and clarity of presentation, student evaluation, and providing additional assistance, if needed. Thus, project staff had little difficulty in characterizing these situations as workplace literacy programs.

2. In one case study firm, completion of the workplace literacy program was required to become eligible for profit-sharing bonuses, but it did not guarantee the bonus.

3. Because the survey first screened households to identify adult education participants and then oversampled such households, it is important to adjust statistical analyses by the sampling weights that have been provided on the file. All the empirical results reported here have been adjusted.

4. The survey was conducted between January and May 1991, so the adult education took place between January 1990 and May 1991.

5. A rigorous parsing of the workplace literacy program participation definition is ([instruction in basic skills such as math, or reading and writing English] *or* [instruction in English as a Second Language]) *and* ([main reason for taking course is to improve, advance, or keep up to date on your current job] *or* [main reason for taking course is to improve your basic reading, writing, or math skills *and* you also had employment- or career-related reasons for taking course]).

6. A detailed analysis of the names of the courses that individuals reported in the NHES data showed a number of advanced academic courses, seminars in general management techniques, and specific computer software training. When these courses were eliminated, there were about 750 thousand participants. Surprisingly, their characteristics did not change much from the distribution presented in the second column of table 5.5.

7. Years of education classes: "Voc/tech after H.S.," "1–4 years college, no degree," and "Associate's degree."

8. These statistics are consistent with studies of Adult Education Act–funded program participant characteristics—relatively highly educated and from middle income levels.

9. This model is consistent with the notion that an individual calculates the perceived benefits from participating in a workplace education program and compares those benefits to perceived costs. In other words, because of uncertainty and incomplete information, an individual cannot know with certainty what the payoffs would be or what the costs would be. He or she will implicitly evaluate the benefits and costs and will participate only if the difference between them exceeds 0. The "indicator" is the unobserved evaluation of perceived benefits minus perceived costs.

6
Impacts of Workplace Literacy Programs

Both major parties to workplace education activity, employers and workers, have an interest in the economic payoffs of workplace education. Employers are investing in the skills of their workforces and expect to receive a return on their investments, just as they would receive a return on an investment in capital equipment. Workers are interested in receiving enhanced job security, higher wages, and career progress in return for the time and effort that they devote to workplace education. Despite the importance of economic payoffs to both parties, almost nothing is known about them. In fact, a barrier to the expansion of such programs is the lack of information about the payoffs to employers. One employer who has invested substantially in a top-notch program told us, "I am happy to give it a try because I understand the logic of the connection between basic skills and productivity. But eventually I have to see a payoff in terms of the bottom line." Employees easily point out higher levels of self-assurance and self-esteem, but they, too, are uncertain about the economic payoffs to workplace education. One employee told us, "I've been attending these [voluntary] classes for eight months, hoping to advance in the company, but it hasn't happened yet and it doesn't look like it's going to."

How Can Economic Returns from Investments in Workplace Literacy Programs be Determined?

Answering the above question presupposes knowing precisely what returns are of interest and how to measure those returns. In the parlance of evaluation, the presupposition is that one knows the objectives of the intervention under evaluation, as well as the methods for measuring them. These are strong assumptions; the selection

of any particular outcome(s) of a workplace literacy program is controversial, and even if there were agreement on the outcomes, they may not be easily measurable.

From an employer's perspective, profits are the primary measure of a firm's economic performance. However, profits depend on many factors external to the firm, such as market conditions for the firm's product, domestic or international competitors' actions, government regulation, taxes, and even the strength of the macroeconomy. Hence, without considerable information on these factors, it would be extremely difficult to determine the influence of a workplace literacy program on profits.

An alternative to trying to relate programs to profits would be to relate them to (labor) productivity, or total output divided by total units of labor. Of course, productivity has a quantity and a quality dimension. The objective of some employers may be to increase quantity (e.g., by providing employees with basic skills upgrading so that they can use more sophisticated equipment), whereas other employers may be more concerned with product quality. For the former, direct measurements of output per unit of labor could be used to evaluate the impact of workplace education. However, for the latter, quality measures such as scrap rates or rework rates would be more appropriate. In either case, there is the problem of trying to disentangle an individual's contribution to productivity or quality, when in fact output is often a joint product of many workers plus capital equipment.

As opposed to employers, workers may be concerned with educational as well as economic outcomes. Workplace literacy programs are intended to enhance workers' basic skills, so it may be most appropriate to hold programs accountable for learning gains. However, when workers are interviewed, it becomes clear that they are interested in programs as a conduit to economic benefits. For some workers, the key is job security. Workers worry about being able to keep up with changing technology and production processes. For other workers, wage growth or promotion are the motives for participation in workplace literacy programs. With any of these outcomes, however, many factors are related to success, and attributing any outcome to a specific program is problematic.

Once appropriate outcomes have been chosen, the next issue to be addressed is how to attribute the outcomes to the literacy initiatives. The difficulty in solving this problem probably explains why so little is known about the economic payoffs to workplace literacy programs. The issue that must be resolved is how to determine what would have happened to the firm and to the workers in the absence of a workplace education program. That is, to understand the *net* impact of a workplace education program, it is necessary to measure what happens after the program and compare those outcomes to what would have happened if the program had not been conducted. The evaluation term for the latter construct is the counterfactual.

From a technical point of view, the best way to estimate the impacts of workplace education would be through a classical experiment. To implement this approach, workers who were interested in pursuing workplace education would be randomly assigned to a group of literacy program participants or to a control group whose members would not participate in the program. The work performance and productivity of the two groups would be tracked, and because of the random assignment, any gains in productivity that accrued to the individuals who took the training could be attributed to the literacy program. The control group represents the counterfactual.

The next best alternative is referred to as a quasi experiment. In this methodology, the workplace literacy program participants are compared to a similar group of nonparticipating workers. For example, workers at one firm may take part in a program, but those at a different firm do not. Then the productivity of the workers at both firms would be tracked. In this case, participants are compared to a *comparison* group rather than a *control* group. In conducting this kind of analysis, the comparison group would be matched as closely as possible to the group of participants, for instance, by choosing firms in the same industry and same geographic area. With this approach, the comparison group acts as the counterfactual. This methodology allows post-program outcomes for the group of individuals who participated in workplace education to be compared to the outcomes of the comparison group, and the assumption is made that any differences result from the program. The drawback to the quasi-experimental approach is that unmeasured or unmeasurable differences may exist between the pro-

gram participants and the comparison group. As a result, there is never any certainty that differences in productivity or firm performance after the workplace literacy program can be attributed to the program.

The last, and weakest, alternative would be to simply track the productivity outcomes of participants only, without a comparison or control group. Such an approach is called a gross impact, as opposed to net impact, study. The problem with this alternative is that there is no explicit counterfactual to judge the success of the program.

Previous Studies of the Net Impact of Workplace Literacy Programs

A substantial literature has addressed workplace literacy programs, but as Mikulecky and Lloyd (1992) indicate,

> only a few workplace literacy programs have been well evaluated, even though millions of dollars have been invested in their development and operation (p. 22).

The evaluations that have been conducted have mainly focused on cognitive outcomes. Only two studies have attempted rigorous evaluations of the economic benefits of workplace education.

Hargroves (1989) reports on a study of a program operated by the Boston Federal Reserve Bank. The bank operated a Skills Development Center for educationally disadvantaged youth that consisted of basic skills training, clerical training, and on-the-job training. This evaluation used a quasi-experimental approach, where 207 trainees between the years 1973 and 1988 were compared to 301 (non–Skills Development Center–trained) employees hired for entry-level positions. Despite the fact that the comparison group had higher levels of education and basic skills abilities, the trainees who were hired by the Fed (about two-thirds of the trainees) had longer job duration and equal earnings.

Mikulecky and Lloyd (1992) report the results of a study using an approach that might be described as experimental. These researchers instituted a formal evaluation system at two companies that included comparing a group of individuals who progressed through a workplace education program to a group who had signed up for such a

program but were waiting for the program to begin. While this was not precisely a random assignment methodology, the authors suggest that the comparison group could act as a control group. One of the purposes of this study was to pilot test the evaluation system, so the sample sizes were extremely limited. Nevertheless, the authors found that the workplace literacy programs at these two firms resulted in the following:

- More instances of use of reading and writing on the job
- Higher participation in meetings on the job
- Higher incidence of asking questions at work
- Significant change in job attendance, safety, or suggestions made
- Significant gain in supervisory ratings (one firm)

These studies and some of the evidence presented below suggest substantial net impacts from workplace education, but it is important not to oversell such programs or overpromise results. Thomas Sticht (1991) writes,

> it is important to distinguish those aspects of productivity that can be shown to be directly mediated or affected by literacy abilities and those that are capable of being affected by factors other than increases in literacy abilities. *Workplace literacy programs should only be held accountable for improving those aspects of productivity directly mediated by literacy abilities.* [emphasis in original]. And even then care should be exercised in building expectations for the effects of literacy education on productivity. Too many other factors, such as poor supervision, bad management practices, substance abuse, and so forth may influence productivity to expect improved literacy to overcome any and all productivity problems. *Workplace literacy providers should not promise more than they can be certain of delivering when it comes to improving productivity* (p. 10, emphasis added).

During a case study, an individual from a provider organization said: "The general manager of the company reported that since our program started, there have been huge gains in productivity." When we talked to the general manager, however, we learned that the gains in productivity could be attributed to a number of major changes that occurred at the same time that the program was started and were unlikely to be related to the program at all. It is hard to fault a zealous provider who

believes in his/her program. But employers are skeptical, and a reputation for overpromising can be quite damaging.

New Evidence on the Impact of Workplace Literacy Programs

The present study presents two types of information about the impact of workplace literacy programs. The first type of information comes from the survey and case studies, in which SIPA or Upjohn Institute project staff asked employers for their assessments of the types of impacts that workplace education programs were having. This information should be considered as indicative rather than firm, because it is simply *ex post* reporting of perceptions and there is no explicit counterfactual. Table 6.1 presents data on the improvement in worker skills and attitudes as a result of the workplace education programs.

In the table, outcomes are categorized into worker basic skills, worker attitudes, and company outcomes. Among the basic skills categories indicated in the first six rows in the table, workers were reported to have shown the greatest gains in communication and mathematics. Writing and problem-solving skills have more modest gains. In terms of worker attitudes and job skills (the next seven rows), the areas of self-confidence, morale, and teamwork were reported to have improved most. Company loyalty, work effort, independent work ability, and ability to use technology showed somewhat smaller gains. Finally, among company outcomes, output quality exhibited a modest gain and all other outcomes showed very little impact.

The second type of information about the impact of workplace literacy programs comes from statistical analyses of the NHES data done for this monograph. The following earnings model was estimated from the NHES microdata:

$$(6.1) \quad \log W_i = a + BX_i + c\,PART_i + e_i$$

where W_i = annual wage of worker i

X_i = characteristics describing worker i thought to be related to i's wages

PART_i = dummy variable equal to 1, if person i participated in a workplace literacy program and 0 if not

e_i = error term

a, B, c = parameters to be estimated

Assuming that wages are equal to worker productivity, the coefficient c is an estimate of the impact of workplace literacy program participation on that productivity. If program participation enhances productivity, then workers will receive higher wages, and c will be positive. On the other hand, if program participation does not influence productivity (or diminishes it) then c will equal 0 (be less than 0). When estimating this kind of equation on cross-sectional survey data such as the NHES, information from the entire sample of individuals is used to determine the relationship between various worker characteristics and wages. Then the coefficient on workplace literacy program participation will be the marginal contribution to wages from participation.

Table 6.2 displays the coefficients from estimating equation (6.1) separately by sex. Because the dependent variable is in log-form, the coefficients in the table (multiplied by 100) approximate percentage impacts. The first row in the table shows that program participation has a strong impact on wages. For men, participation in such an activity is associated with a 17–19 percent wage advantage. For women, this impact is 11–18 percent, although the impact is not statistically significant when a series of industry and occupational dummy variables are added to the model.[1] These impacts are evidence suggesting a significant payoff to workplace literacy program participation. Not only is the payoff positive, indicating productivity enhancement, but it is of substantial magnitude.

The other coefficients in the table generally accord with other empirical studies of earnings. A year of formal education increases earnings by 3–6 percent for men and 5–8 percent for women. Note that the literacy program participation effect is equivalent to about 3–5 years of formal education for men, and 2 years of formal education for women. Residence in a Metropolitan Statistical Area (MSA) raises earnings for both men and women. For men, being of minority

Table 6.1 Evaluations of Improvement in Worker Skills from Responses to Follow-Up Survey

Skill	Improvement: None (0)	Very little (1)	Moderate amount (2)	Very much (3)	Mean score
Basic skills					
Reading	0	4	3	1	1.6
Percent	0.0	50.0	37.5	12.5	
Writing	0	4	2	2	1.8
Percent	0.0	50.0	25.0	25.0	
Mathematics	0	2	5	4	2.2
Percent	0.0	18.2	45.5	36.4	
English	1	1	1	0	1.0
Percent	33.3	33.3	33.3	0.0	
Problem solving	1	4	3	4	1.8
Percent	8.3	33.3	25.0	33.4	
Communication	0	2	5	5	2.3
Percent	0.0	16.7	41.7	41.7	
Employee attitudes and job skills					
Work effort	2	8	1	0	1.7
Percent	18.2	72.7	9.1		
Company loyalty	0	4	6	3	1.9
Percent	0.0	30.8	46.2	23.1	
Employee morale	0	2	8	3	2.1
Percent	0.0	15.4	61.5	23.1	
Independent work ability	1	3	7	2	1.8
Percent	7.7	23.1	53.8	15.4	
Team work	1	2	6	4	2.0
Percent	7.7	15.4	46.2	0.8	
Ability to use technology	3	3	6	1	1.4
Percent	23.1	23.1	46.2	7.7	
Self confidence	0	2	5	6	2.3
Percent	0.0	15.4	38.5	46.2	
Company outcomes					
Retention of employees	6	1	4	1	1.0
Percent	50.0	8.3	33.3	8.3	
Absenteeism/lateness	5	4	2	2	1.1
Percent	38.5	30.8	15.4	15.4	
Advancement (promotions)	3	4	4	2	1.4
Percent	23.1	30.8	30.8	15.5	
Worker safety	3	4	2	2	1.3
Percent	27.3	36.4	18.2	18.2	

Skill	Improvement				
	None (0)	Very little (1)	Moderate amount (2)	Very much (3)	Mean score
Output quality	1	3	8	1	1.7
Percent	7.7	23.1	61.5	7.7	
Customer satisfaction	4	2	4	3	1.5
Percent	30.8	15.4	30.8	23.1	
Scrap/error rates	4	3	1	3	1.3
Percent	36.4	27.3	9.1	27.3	
Productivity	4	3	6	0	1.2
Percent	30.8	23.1	46.2	0.0	
Sample size 14					

Table 6.2 Regression Estimates of the Impact of Program Participation on Earnings

Characteristic	Males		Females	
	(1)	(2)	(3)	(4)
Workplace literacy program participation	.188**	.166**	.181*	.109
	(.082)	(.078)	(.094)	(.089)
Education				
Years of education	.056***	.033***	.079***	.054***
	(.044)	(.004)	(.004)	(.004)
Currently full-time student	-.441***	-.398***	-.364***	-.321***
	(.036)	(.035)	(.034)	(.033)
Currently part-time student	.090*	.074*	.095**	.063
	(.047)	(.044)	(.042)	(.040)
Demographics				
Minority	-.193***	-.149***	.014	.064***
	(.025)	(.024)	(.024)	(.023)
Married	.213***	.189***	0.57***	-.073***
	(.025)	(.024)	(.020)	(.020)
Children < 16	-.008	-.013	-.165***	-.142***
	(.024)	(.023)	(.023)	(.022)
Homeowner	.105***	.094***	.017	.033*
	(.022)	(.021)	(.020)	(.019)
Location				
South	-.037*	-.044**	.029	.006
	(.019)	(.018)	(.019)	(.018)
MSA	.226***	.183***	.128***	.079***
	(.021)	(.021)	(.021)	(.020)
Industry/occupation dummies	No	Yes	No	Yes
R^2	.2666	.3461	.1633	.2472
Sample	5,111	5,111	6,372	6,372

SOURCES: Author's OLS regression estimates of data from U.S. Department of Education, National Household Education Survey. Standard errors of coefficients are presented in parentheses.* Statistically significant at the .10 level; ** statistically significant at the .05 level; *** statistically significant at the .01 level.

ethnicity reduces earnings, whereas being married and a homeowner are associated with higher earnings. For women, being married and having children less than 16 years old are negatively associated with earnings.

Several caveats need to be borne in mind when interpreting the results presented in table 6.2. First of all, the causality might be reversed—it may be the case that higher levels of earnings "cause" individuals to be able to afford and therefore to participate in workplace literacy programs. I discount this possibility, however. Whereas such an argument may hold for other types of educational activities (avocational subjects or postsecondary study), it seems less likely that individuals would consume education geared toward basic skills. A second caveat, however, is that the relationship between program participation and wages may be the result of a third unobserved or unobservable variable. For example, individuals who participate in workplace literacy programs may have more "initiative." At the same time, earnings may be positively related to "initiative," so the relationship between the two is really an artifact of the missing third variable. There are statistical methods for controlling for such missing variables, but they rely on longitudinal data sources (which the NHES is not) or on more data than are available in the NHES. A third caveat is that the "payoff" to literacy program participation may be partially due to simultaneous changes in the workplace. Firms that offer workplace literacy programs may also be investing in new capital equipment or reorganizing their production activities. Without data on the firm, it is not possible to disentangle the returns to literacy programs from the returns to other changes in the workplace.

These caveats aside, the NHES analyses are suggestive of a sizable, positive net economic payoff to workers who participate in workplace literacy programs. Furthermore, the two studies reviewed briefly in this chapter are also positive. Although the body of evidence is far from overwhelming, it does point in the direction of a positive payoff. Considerably more study and analyses are needed, however, to confirm these results and to answer the question of what types of workplace literacy programs work for whom under what conditions.

NOTE

1. When these models were reestimated on the subset of data after removing advanced coursework, management courses, and specific software training, the impact of workplace literacy program participation ranged from 20–22 percent for men and 0–9 percent for women.

7
Summary of Findings and Policy Recommendations

Summary of Findings

Workplace literacy programs have been established in a small share of business firms. The employers who offer these programs are responding to both internal and external factors. The main internal motivation is to upgrade the firm's workforce. A substantial share of hourly workers, perhaps 25–40 percent, have some basic skills deficiencies, and firms link basic skills improvement to productivity enhancement. Another important internal force is workplace restructuring. Firms are responding to increased domestic and foreign competition by reorganizing their production processes with techniques such as total quality management, self-managed teams, just-in-time inventory procedures, or investments in new technology. Each of these activities may require substantial retraining of employees and upgrading of skills. Externally, firms report that customer requirements have played a significant role in initiating programs.

Considerable variety exists among the programs offered. Some are formally scheduled; others meet occasionally. Skills taught run the gamut from standard GED preparation curriculum to pretechnical training mathematics to interpersonal skills training. Instructors may be among the firm's employees, or they may be professionals from local educational institutions. This variety is to be expected, since the employers with programs are for the most part taking ownership of the programs and tailoring them to fit the employers' specific workforces and production processes.

Less variance exists in the employers' self-evaluations of program impacts. For the most part, programs are seen as modestly improving workers' basic skill levels, having more significant impacts on worker self-confidence and employee morale, and having, at best, small positive effects on company performance. These modest

impacts are also to be expected; the average annual out-of-pocket investment for programs made by employers is estimated here to be around $14,000.[1] A more important question than the level of program impacts on individual employees is the return on investment. Firms with programs clearly feel that the benefits exceed the cost, although few have made formal attempts to calculate this impact. Many firms without programs must share this perception, because almost one-fourth of the Michigan respondents to the SIPA telephone surveys who did not have programs indicated that they would like to initiate a program.

The following summarizes significant findings from this study. Note that all findings are based on the responses and opinions of Michigan employers as expressed in a survey or to on-site case study observers and do not result from formal assessments.

Need

- 25–40 percent of hourly employees have some basic skills deficiencies
- Levels of deficiencies seem to be greater for problem-solving skills, interpersonal skills, and mathematics than for reading and writing
- Levels of deficiencies seem to be greater in manufacturing than in nonmanufacturing firms

Incidence

- Perhaps fewer than 5 percent of small business firms have a workplace literacy program, although this estimate is uncertain because of measurement problems such as response selectivity and lack of a clear-cut definition of what comprises a program
- A significant share of employers respond to basic skills deficiencies by increasing hiring standards or by reorganizing work

Why firms do or do not offer workplace literacy programs

- Firms with programs have workforces that are reported to exhibit higher levels of basic skills difficulties and therefore to have higher levels of need
- Firms with programs tend to link basic skills of workers to productivity more strongly than firms without programs

- The major reasons for offering such programs are as follows (roughly in descending order):
  - —Receipt of a subsidy
  - —To improve employee well-being
  - —To meet customer requirements/improve customer relations
  - —To overcome basic skills deficiencies among workers
  - —To meet increased competition
  - —To prepare for further, more technical training
- The major reasons for *not* offering such programs are as follows (roughly in descending order):
  - —Basic skills are not perceived to be a serious problem
  - —Need more information about employee need or program implementation
  - —Requires too many resources (time, staff, or financial)
  - —Never considered doing so
  - —Negative toward workplace literacy programs
- Over 20 percent of firms without programs would like to initiate a program

Characteristics of firms with and without programs

- Firms with programs have more employees, on average, than firms without programs
- Firms with programs spend more on all forms of employee training
- Firms with programs are in the manufacturing sector
- Firms with programs have undertaken more reorganization of work activities
- Firms with programs are not unionized
- Firms with programs pay higher wages and have better benefits
- No differences exist between firms with programs and those without programs in the following areas:
  - —Profits
  - —Turnover
  - —Internal labor markets
  - —Gender composition of the workforce

Attributes of workplace literacy programs

- Virtually all programs have received financial support from the company; most firms have received financial or material support from an external agency
- Most firms provide release time (the very small sample of firms that provided precise data, averaged 8.9 hours of release time per worker per week)
- Over half the programs are voluntary; the others are at least partially mandatory
- The following skills are taught (roughly in descending order):[2]
  - —Problem solving
  - —Interpersonal skills
  - —Math
  - —Reading and writing
  - —Standard GED curriculum
  - —ESL
- About half the programs utilize company employees as instructors; about half employ instructors from a local educational institution[3]
- Among the small sample of firms providing cost data, the average annual out-of-pocket cost was $14,525, and 60 percent of hourly employees participated in the program

Program impacts

- Among worker skills, improvement was greatest in communication and mathematics
- Among worker attitudes and job skills, improvement was greatest in self-confidence, employee morale, and teamwork
- Among company outcomes, improvement was greatest in output quality
- Using national data, workplace literacy program participation may enhance an individual's productivity and earnings by 10–20 percent

Policy Recommendations

Workplace literacy programs are in their infancy and information varies considerably in terms of its credibility. During the course of this study, project staff conversed with managers or owners of businesses reputed to have well-developed, significant literacy programs, and they were disappointed to find programs that turned out to be marginal, at best. On the other hand, staff had conversations with managers and owners who timidly suggested that their programs were hardly worth studying, and yet the programs turned out to be quite significant.

Among the hundreds of workers interviewed in Michigan, we found enthusiastic supporters of workplace literacy programs. One employee told us, "There were days when I would have stayed home from work [been absent] except that I didn't want to miss my class." On the other hand, we had an individual ask, "I work as a maid in a hotel, why do I need to know how to read?" To set the stage for the conclusions and policy recommendations of this study, the next few paragraphs present an overall theme for workplace literacy programs. These paragraphs are followed by specific policy recommendations.

Overall theme

After reviewing literature in the area and interviewing managers and employees, staff members from provider agencies, and government agency staff at the federal and state level, I would give to workplace literacy program initiatives the theme of "ships passing in the night." Employers face tremendous competitive pressures, and they sense that employees are a key resource in that competition. However, they have not embraced education and training as important investments in that resource in the same sense that they have embraced the quality movement or technological change. Employees feel tremendously insecure and vulnerable to the changing workplace. They are looking for education to provide them with job security and potential advancement. However, workplace literacy programs are not perceived as delivering on higher wages or advancement in the company, and worker patience is perhaps being stretched.

The external education providers encountered by project staff are impressive in terms of dedication and capability. Handicapped by a paucity of job-related curricula and instructional materials, these men and women are establishing excellent rapport and making significant achievements with employees who for the most part distrust and dislike formal schooling. It appears, however, that providers have relatively little interaction with management personnel and are receiving their navigational guidance from employees.

The final stakeholder in workplace literacy initiatives is the public sector. Here the federal government has just barely set sail and state government has returned to the dock. Aside from funding adult education, which has traditionally been geared toward individuals, the federal government has just begun to establish a workplace focus. Programs are competing for scarce federal dollars, however, and are developing very slowly. At the state level, following an administration that aggressively used training grants for economic development purposes, the current state administration has pared back such programs in the restructuring needed to reduce a huge state budget deficit. The perspectives of the various entities involved in workplace education are amplified below.

Employers

Most of the employers who were interviewed either in case studies or through the mail survey were in the manufacturing sector. Downsizing and difficulties in the automobile industry have rippled through the manufacturing economy in the State of Michigan and caused significant distress. It is clear that employers are now responding through restructuring and reorganization. Perhaps the most dramatic evidence of changes in the workplace is the way that business, not only manufacturing but also the service sector, has embraced total quality management (TQM). One method for achieving quality adopted by many companies is statistical process control (SPC). Utilization of SPC has been an important stimulus to workplace literacy programs because companies found that employees did not have the basic math or statistical knowledge or skills to implement SPC. This is one reason why employers report more extensive deficiencies in

basic math skills than in reading, and why more programs observed included math instruction than reading or writing.

Another type of workplace restructuring resulting from increased competitiveness has been an emphasis on reducing layers of middle management and pushing decision-making authority down to the shop floor. As one employer succinctly stated it, "Middle management is a waste." Such restructuring requires the development of problem-solving skills of workers, and many workplace literacy programs are explicitly teaching those skills.

Employers want an engaged, problem-solving workforce. They want production workers to understand the overall nature of the business, to be able to troubleshoot effectively and solve problems, and to be able to communicate with each other and with management. Having literate workers per se is not usually their goal so much as having workers who are productively on task, who are flexible, who can easily adapt to changing circumstances, and who know how to solve problems. Education and training are seen by employers as means to their own objectives. While they are generally aware that basic skills deficiencies may exist among their workers (although they may severely underestimate the extent of the deficiencies), they have not fully embraced education and training as a solution. Very few managers have taken the time or had the inclination to get involved in actual curriculum and instructional decisions. One firm that had had a well-established, well-operated program dissolved the program altogether in a cost-cutting move.

In short, employers are engaged in a considerable amount of restructuring and reorganization. They generally acknowledge the importance of a skilled workforce to overall firm performance and recognize the role of training and education investments in that workforce. However, employer support of workplace education is *broad, but shallow*.

Employees

In the troubled state of the economy, employees feel insecure and underpaid. These perceptions seem valid. A striking number of companies rely on temporary employment agencies to achieve labor flexibility, and layoffs have been endemic to Michigan manufacturing for

the last few years. Project data on wages and benefits have shown, for example, that mean wage rates for production workers in small businesses are approximately $6.50–$8.00 per hour. Many employers acknowledge that wage rates are low, but they feel squeezed by competitive pressures.

Employees who participate in workplace literacy programs generally acknowledge their skill deficiencies and are looking for education to improve their job security and lead to higher wages. Ironically, while these economic outcomes are not happening in general, another unexpected outcome occurs almost universally. These individuals cite improved self-confidence and self-esteem as a result of participation in the programs. Such payoffs are important to participants and lead them to continued participation. But employees still express some impatience with the fact that education has not led to improved job security or tangible wage increases.

The number of employees who participate in workplace education programs at any given time is small. Some of the barriers to participation include an unwillingness to divulge basic skills problems, reluctance to invest hours outside of work time, and constraints imposed by transportation or family responsibilities. Many of the small minority of workers actively participating in programs, however, have become "true believers" in the programs and made considerable learning gains. Overall, employee support and participation in workplace education may thus be characterized as *narrow, but deep*.

Providers

In Michigan, workplace literacy program provider organizations seem to be about equally split between local education agencies and community colleges/other institutions of higher education. Often these two types of organizations supplement their paid professional staff with volunteers. The instructors and volunteers, who are quite capable and highly dedicated to their task, bear most of the responsibility for a program. In the typical program model, an administrator from the provider organization will meet with company management and agree on very general principles; then the instructor must flesh out the program to meet the needs of the employees. Curriculum and

materials are generally customized from existing materials used by the provider organization in formal classes.

Because their everyday contact is with workers and because any feedback they get typically comes from their students, instructors naturally tend to tailor instruction to the needs and interests of the students. Often this leads to course content with minimal reference to the workplace. There are advantages and disadvantages to this approach. First of all, instructors argue that learners will be most enthusiastic and interested in subjects most relevant to them personally, so that learning gains will be greatest with such an approach. The other side of the argument, however, is that employers support workplace education to improve worker productivity, and research has shown that productivity gains tend to be greatest from programs that include job-specific material in the curriculum.[4]

The overall picture of workplace literacy programs presented in this study, which is based largely on programs in Michigan but generalizes to other states, indicates that the perspectives of the major stakeholders are not totally in agreement. The extremely limited incidence of workplace programs and the limited participation in extant programs (with perhaps the exception of "quick fix" programs) suggest that there is considerable room for programmatic enhancement and expansion. The final section of this monograph addresses how public policy might facilitate such improvements.

Recommendation 1. Public funding of workplace literacy programs is warranted and an expansion of existing governmental resources could greatly multiply the number of company programs, which would reduce the mismatch between the significant needs of the workforce and the scant number of workplace opportunities to overcome basic skill deficiencies.

The theoretical model presented in chapter 2 justified public support for workplace literacy programs on the basis of the external benefits that accrue to society. Imperfections in capital markets are another justification for public support. Although workplace literacy programs may be viewed as an activity engaged in by private sector employers and their employees, there are clearly social costs to having a labor force deficient in basic academic skills. Individual unemployment may result from basic skills deficiencies, and society then

provides support in the form of unemployment compensation and bears the cost of forgone tax receipts. But even when workers remain employed, there are social costs to be borne from firms not operating at capacity and not able to adopt technological advances to maintain their competitiveness. For these and other reasons, governmental agencies are involved in supporting workplace literacy. Unfortunately, the resources available to help providers and employers establish effective programs are not centralized or easily accessed.

The two major agencies involved in financial support of workplace literacy at the federal level are the U.S. Departments of Education and Labor. A third entity, the National Institute for Literacy, is currently being established. By far the largest source of funding at the federal level is the Adult Education Act (known as the National Literacy Act of 1991). The Adult Education and Literacy Division of the Office of Vocational and Adult Education of the U.S. Department of Education funds and administers this program, which provides, free of charge, Adult Basic Education and GED preparation to any individual, age 16 or over, who has left school and does not have a high school diploma or its equivalent. Most of this education takes place in schools and is operated by local educational agency adult education staff. However, more and more programs are now being operated in the workplace. This arrangement is to the firm's advantage because instructional costs and materials are paid for through federal funds, and it is to the local education agency's advantage because it extends enrollment and service.

This office in the U.S. Department of Education also administers a grant program entitled the National Workplace Literacy Program, which is also part of the Adult Education Act. Between 1988 and 1991, slightly more than 200 grants were awarded, totaling about $60 million. These grants are usually awarded to educational agencies that have formulated partnerships with employers and/or unions.[5] An evaluation of the national program done in 1991 criticized the short duration of the grants (12–18 months) and the fact that most private sector partners were large businesses. In response, the National Literacy Act of 1991 altered the grant program to allow grants to last up to three years and to favor proposals that involve small business.

The U.S. Department of Labor administers the Job Training Partnership Act (JTPA), which is intended to provide education and train-

ing to unemployed, disadvantaged workers. This program funds literacy training and basic skills education for its clients, however, because it is pre-employment training, it cannot be considered a workplace literacy program.[6] Aside from JTPA, the Labor Department has created some new initiatives in the area of workplace literacy. The National Literacy Act charged Labor with administering a National Workforce Assistance Collaborative Program for providing training and technical assistance to firms. In the Office of Workplace Learning of the Labor Department, this program is being developed (rules and procedures are being written) under the acronym of TEAMS (Technical Education Assistance to Medium and Small-sized firms). Grants to firms are being considered as a program option.

The National Literacy Act of 1991 established the National Institute for Literacy. As of the date this monograph is being prepared, the Institute has been formally housed in Washington, D.C. and is in the process of staffing. Workplace literacy is one focus of the National Institute for Literacy, and its first round of funded research and demonstration grants includes four projects in this area.[7]

In Michigan, the previous state administration aggressively used training grants to business as a tool for economic development. In the course of the project's case studies, staff encountered several firms that had initiated their programs with support from Quickstart funding from the Michigan Department of Education, or Upgrade or MBIT grants through job-training funds from the Michigan Department of Labor. The current state administration has eliminated these programs in its effort to balance the state budget, however.

Federal and state adult education funds are administered in Michigan by the Adult Extended Learning Service (AELS) of the Michigan Department of Education. This office provides and monitors funds for various local school district adult education offices. It also operates the Michigan Adult Literacy Initiative (MALI), which presently is staffed by a statewide coordinator and 14 regional facilitators. MALI, which began in 1985, has actively facilitated the development of volunteer literacy agencies in all counties across the state. This has been accomplished through strengthening existing groups and assisting in the formulation of new groups. MALI does not provide direct funding for workplace literacy programs per se,[8]

although it does offer informational and promotional services around the state to both community and workplace literacy programs.

Currently, the only state program that might be used to support workplace education other than AELS technical assistance or adult education funding is the Michigan Training Incentive (MTI). MTI is a subsidized interest loan program, by means of which firms can borrow funds to offer a training program, and the state will subsidize the interest on those funds.

The current state administration recognizes the need to play a role in supporting workplace education and is using two innovative ways of accessing federal sources of funds. Michigan is the first state to actively pursue the use of Community Development Block Grant funding for training purposes. Here the applicant for funds is a community, but funds may be used for training purposes. Second, the current administration has initiated a program entitled Adult Education Alternative Training. Funded at $25 million, this program is similar to the National Workplace Literacy Grants in the sense that it will fund educational institutions that work in partnership with the private sector to provide education and training.

Thus it can be seen that some federal and state initiatives support workplace literacy programs. However, the recommendation above suggests that these initiatives should be expanded. Chisman (1992) estimates that public support of programs may be as high as $75–$125 million.[9] To determine whether this public investment is adequate requires an estimate of the social benefits of workplace literacy programs.

Data from the NHES suggest that approximately 1.5 percent of the labor force engaged in workplace education activities in 1991, and that these individuals increased their wages (and thus productivity) by 12–20 percent. As described above, some of these (self-reported) activities should not be considered workplace literacy program participation. But even using a conservative estimate that .5 percent of the workforce participated in workplace literacy programs and that these individuals, on average, improved their productivity by 10 percent results in an estimated increase in the national Gross Domestic Product (GDP) of $2.5 billion.[10] Thus I estimate that approximately $100 million of public support of workplace literacy programs is generating $2.5 billion in economic activity.

The question still remains as to what the level of public support should be. An answer to that question depends on the level of social benefits that result from workplace literacy programs. If we arbitrarily assume that social benefits can be valued at 20 percent of the total private benefits,[11] then public support should be approximately $500 million, or about *five times* the current level of support.

The extent to which the additional funds should be split between the federal and state levels is not clear. (The largest proportion of general educational support comes from state and local sources, whereas most of adult education funding comes from the federal government.) Some states are already offering modest grants to firms to establish programs. The State of Illinois, for example, offers "mini-grants" of up to $10,000 to employers for the purpose of workplace literacy training. This program may be a useful model for other states to follow. It seems incomprehensible that the U.S. Department of Education, with its $60 million in workplace literacy grants, has only funded about 200 organizations to date. If it had parceled these funds out in smaller grants, as the Illinois program did, they could have assisted 6000 firms!

Given fiscal constraints at all levels of government, another important role that the federal or state government might play would be to provide technical assistance to employers.

> **Recommendation 2.** The federal and state governments should establish a centralized, accessible system for providing technical assistance to firms interested in establishing workplace literacy programs. This technical assistance should be targeted at small businesses who lack the resources to investigate thoroughly issues such as assessing workers, identifying providers, developing curricula, and logistics such as scheduling and facilities.

It must be bewildering for an employer who has read an article in the newspaper or has heard a presentation at a service club and wants to investigate basic skills deficiencies among his or her workers and to establish a program, if it is needed. If the employer wants to undertake a thorough investigation of the subject, he or she will be quickly stymied by the large number of different actors or agencies, all with slightly different perspectives and motives, and by the extent to

which information, of uneven accuracy and thoroughness, is passed on via word of mouth.

A tenacious employer will be able to find some sources of advice and technical assistance from federal and state government agencies, educational institutions, or literacy advocate organizations. As mentioned above, the U.S. Department of Labor is developing the TEAMS program to provide training and technical assistance to firms. A second initiative of the Labor Department is a Training Technology Resource Center, which is intended to be an information clearinghouse. Service delivery agencies in the JTPA system are targeted as the primary users of this service, but Labor is developing the system so that anyone can retrieve information about training technology. At this point, the Department is developing a prototype management information system.

Although the U.S. Small Business Administration (SBA) does not provide direct support or technical assistance to the private sector for education and training, it does act as a brokering agency that would couple an appropriate resource with a business that needs assistance. In other words, a firm may contact a regional office of SBA with a request for assistance in establishing a workplace literacy program, and SBA would connect that firm to the nearest SBI (Small Business Institute) or SBDC (Small Business Development Center). While some of the SBIs and SBDCs may have training expertise, it should be pointed out that SBA technical assistance is most often provided in financial or marketing areas.

At the state government level in Michigan, technical assistance is provided by the Michigan Adult Literacy Initiative (MALI), which was mentioned above.

Educational Institutions

Most of Michigan's 13 public universities or colleges also offer some types of technical assistance or management education to the private sector, but only Eastern Michigan University has a strong presence as a provider of workplace literacy programs.[12] Central Michigan University received one of the U.S. Department of Education's Workplace Literacy grants to establish an adult literacy center, but that center ceased operation when the grant ended. Central has

recently been granted funds to operate the State Literacy Resource Center, however.

A number of Michigan's 29 publicly supported community colleges provide actual workplace literacy programs as well as technical assistance to firms. These colleges are somewhat uneven in their interest and experience in working with the private sector. However, their community education or business/industry/labor divisions are excellent and should be among the first contacts that any company interested in establishing or pursuing a program should make. Finally, as alluded to above in the discussion of the state Adult Education Learning Service, public school districts have adult or community education departments that can provide technical assistance and perhaps direct instructional services to employers. They also should be a primary contact for companies.

Literacy Advocates

Michigan Literacy, Inc. (MLI) is a nonprofit, private organization not directly affiliated with any state agency. MLI works through local libraries and community-based organizations (CBOs) and other organizations to establish literacy programs and acts as an information provider and communication link among them. MLI estimates that presently there are 140 such local groups statewide, but it also estimates that fewer than 10 of these are providing services directly in the workplace.

National literacy advocates include PLUS (Project Literacy U.S.), which is funded by PBS and Capital Cities/ABC and the Business Council for Effective Literacy (BCEL).[13] Both of these organizations provide information using a variety of media to heighten public awareness and encourage individual and corporate involvement in literacy.

Despite a wide variety of available resources and organizations, the incidence of workplace programs is very small, and a severe mismatch exists between need and availability of programs. It must be concluded that information barriers are not being overcome, particularly for small businesses. An effective way to improve information provision would be to establish regional-based workplace literacy program specialists, whose duties would involve outreach and infor-

mation provision to employers. South Carolina and Virginia, for example, have established such systems. An important feature of an information provision system is that it must have adequate resources to reach a large number of employers and provide credible information about local resources.

A less expensive means of providing information might be to develop an informational brochure or catalog that lists education provider agencies in an employer's general location and offers information about other potential resources that employers could access.

Recommendation 3. State and federal agencies should expand research into workplace literacy program effectiveness.

Funding agencies, mainly the U.S. Department of Education, are supporting a considerable amount of work in workplace literacy program curriculum development, instructional strategy (including assessment), and dissemination. Training providers generally have a number of sources from which to choose or customize materials as they develop courses.

Two areas of research that are not receiving adequate attention, however, are program evaluation and estimation of the productivity impacts of workplace literacy programs. At this point, little hard evidence exists about what programs work best for whom under what conditions. As described in chapter 6, the best way to determine effectiveness is through rigorous net impact analyses that involve control/comparison group designs. To my knowledge, no evaluations of this type are being undertaken for workplace literacy programs.

An issue closely related to the effectiveness of workplace literacy programs is the extent to which the programs enhance productivity. Many firms with literacy programs maintain a wealth of information on individual or team productivity but do not have the resources or capability to analyze this information with statistical rigor. Manufacturing firms, for example, monitor closely such statistics as scrap or rework rates. Service firms keep statistics on service complaints or number of customers served. Research that maintains the confidentiality of these data can and should be undertaken to gauge the precise productivity enhancements that can be attributed to workplace literacy programs. Until rigorous evaluation and research are undertaken, employers will continue to favor investments in physical capital,

whose returns are tangible and measurable, over investments in human capital, whose returns are uncertain, but perhaps more sizable.

NOTES

1. Based on a very small sample of programs.

2. Case study programs had a much higher incidence of math and reading/writing and much lower incidence of problem solving and interpersonal skill training than did the survey respondents.

3. Case study programs had fewer instances of in-house instructors.

4. Conversation with Larry Mikulecky. Mikulecky's research has shown that workers, like all learners, tend to absorb best exactly what is taught. If subject matter is unrelated to work, then workers will not readily transfer their skills to the work context.

5. To date, five of the awards have been given to Michigan partnerships.

6. JTPA does provide on-the-job training contracts, but these must involve specific job-related skills.

7. See "Institute Awards 36 Literacy Research and Demonstration Grants," *Literacy News*, Vol. 1, no. 6, October 1992.

8. MALI recently merged with the Staff Development Collaborative of AELS, which is an activity that provides funding for and facilitates staff development.

9. The basis for this estimate is an estimate that 3 to 5 percent of small business firms have workplace literacy programs and that each program is receiving an average subsidy of $5,000 (approximately half of the average cost according to Chisman). The total public support estimate is probably on the high side—Chisman's estimate of the incidence of programs may be slightly high, and his assumption of 100 percent of the programs receiving some subsidy is undoubtedly high. On the other hand, the assumption that, on average, half of program expenditures are subsidized *for a program that receives a subsidy* is not unreasonable.

10. Interestingly, one gets approximately the same estimate by assuming that small business accounts for 50 percent of GDP and workplace literacy programs could increase, by 10 percent, the productivity of 10 percent of the workers at 10 percent of the small businesses. In other words, the economic stimulus that would be achieved from a program that increases by 10 percent the productivity of 1 percent of the workers in small business (a reasonable target for a workplace literacy program) is about $2.5 billion.

11. It is exceptionally difficult to value all the social benefits of workplace literacy programs, but for comparison purposes, note that the costs of instruction at institutions of higher education are split between the public and students at a ratio of 2:1. That is, about two-thirds of the instruction-related costs of higher education are financed publicly and one-third are finance by tuition and fees. Is it unreasonable to suggest that the public should finance one-fifth of workplace literacy program costs?

12. As opposed to the direct provision of workplace education, the University of Michigan has a contract with the UAW-Ford-National Education, Development, and Training Center to provide a full-time Life/Education Advisor (LEA) at all Ford plants.

13. BCEL ceased operation as of June 30, 1993.

Appendix
Case Study Summaries

This appendix provides short, standardized summaries of the 28 case studies conducted in Michigan by Institute staff. It includes firms participating in case study pretests, firms participating in Phase 1 case studies, and firms participating in Phase 2 case studies. For companies without a program, the summaries provide information about the firm and what the companies told the interviewer about why they did not offer a workplace literacy program.

Firms Participating In Case Study Pretests

INDUSTRY (SIC):	Paperboard Containers and Boxes (265)
PROGRAM:	Yes
LOCATION:	Kalamazoo MSA
EMPLOYMENT SIZE:	173 (at 3 locations)
DATE(S) OF SITE VISIT:	March 14 and 15, 1991

HISTORY OF PROGRAM: The underlying problems that the training was meant to address were poor worker performance in SPC training and a high rate of turnover, particularly among disadvantaged workers. As a federal government contractor, the firm was obligated to meet particular EEO standards, but it had found that many minority entry-level applicants and new hires in unskilled jobs had basic skills deficiencies. The firm contracted with the local adult education department of the public schools to offer on-site training in reading, writing, and mathematics. The firm pays for release time and incidental costs. Most of the instructional costs are subsidized by Adult Education funding.

CHANGE EVENTS/RESTRUCTURING: The firm has experienced steady growth and has invested in new technology and offered SPC training.

PROCESS FOR ASSESSMENT OF WORKERS: The provider assessed all production workers at one company site using the Adult Placement Indicator (API) Form A and Inventory of Essential Skills. All individuals with less than an eighth-grade level in math or English were required to participate in the program.

GENERAL DESCRIPTION OF THE PROGRAM: The firm provided space for the instructor to establish a classroom. A variety of classes are offered three to four afternoons per week in mathematics, reading, and writing skills. The curriculum is customized from standard ABE course materials offered by the public schools. Several workers were preparing for GED.

PROVIDER TYPE: Adult education department of public school system.

SUBJECT(S): Math, reading, writing.

INSTRUCTION TYPE: Depends on class; one math class was self-directed, but most classes were in an informal group discussion format.

NUMBER OF PARTICIPANTS: 35–40 workers had started. At the time of the site visit, a total of 27 individuals were participating.

RELEASE TIME: Fully reimbursed by the company; often paid at time-and-a-half for overtime. Company reported a cost of $40,000 in first year of program.

EVIDENCE OF IMPACT: Management felt that the program had been responsible for reduced error rates. Workers and instructor indicated great improvements in self-confidence and self-esteem. Several students were interested in enrolling in postsecondary programs.

CASE STUDY SUMMARY: This is a substantial program with a large share of the workers participating and substantial investment by the company. The on-site classes, instructional quality, and participation were impressive. The only criticisms that might be leveled at the program are rather poor communication among the key actors and no planned link from basic skills training to SPC training. All in all, the program stood out as one of the most comprehensive.

INDUSTRY (SIC):	Plastics Products (3089)
PROGRAM:	No
LOCATION:	Kalamazoo MSA
EMPLOYMENT SIZE:	167
DATE(S) OF SITE VISIT:	March 19, 1991

WHY NO PROGRAM: The main reason why there is no program is that the management does not perceive that there is a need for one and because recently installed, advanced, automated equipment has de-skilled the work.

CHANGE EVENTS/RESTRUCTURING: A young, growing company whose approach is to utilize the most advanced technology in order to achieve productivity.

CASE STUDY SUMMARY: This is a successful company that was recently formed as a spin-off from another company. The management acknowledges that the workforce has basic skills difficulties, but feels that advanced technology can "work around" such difficulties. Labor supply is abundant in this area, so workforce can be screened to some extent.

Firms Participating in Phase I Case Studies Industry

INDUSTRY (SIC):	Public Building and Related Furniture (253)
PROGRAM:	Yes
LOCATION:	Grand Rapids MSA
EMPLOYMENT SIZE:	437
DATE(S) OF SITE VISIT:	May 20, 1991

HISTORY OF PROGRAM: Company president inspired by workplace literacy presentation given at a meeting of community business leaders. Three management staff were trained as literacy tutors, and the workforce was assessed and offered tutoring on a volunteer basis. The program had been in existence for two years.

CHANGE EVENTS/RESTRUCTURING: The company is growing, having doubled in size since 1985, due to increased demand for their products. Very few changes in technology or production processes, however.

PROCESS FOR ASSESSMENT OF WORKERS: The WRAT was offered to 270 production workers as an assessment tool, and 220 actually took the test. Those who scored low were encouraged to volunteer for literacy tutoring.

GENERAL DESCRIPTION OF PROGRAM: Participants receive one-on-one literacy tutoring from other employees of the firm. The training is not job related. Materials used are whatever the individuals are interested in and usually relate to hobbies or outside interests.

PROVIDER TYPE: The tutors are employees of the firm. Three management employees were trained in literacy tutoring by the community's literacy council, and these employees in turn have trained other employees.

SUBJECT(S): Literacy: Reading and writing.

INSTRUCTION TYPE: One-on-one tutoring.

NUMBER OF PARTICIPANTS: Ten to 12 people volunteered for tutoring, but of those, 3 to 4 quit the tutoring. The remainder are still being tutored.

RELEASE TIME: The firm offers one hour per week release time; however, most of the participants wanted to keep their participation confidential, and so they use lunch or afterwork hours for tutoring.

EVIDENCE OF IMPACT: The company feels that trainees have not shown much improvement in abilities, but have demonstrated improved attitudes toward work and toward their own skill deficiencies. They are much more open about it and are not "scared to admit" their problems. In contrast, participants

were enthusiastic about their improved abilities and cited specific examples of how they can now use reading and writing to be more effective on the job. One worker is now able to write notes to second shift workers, another is now better organized about his work, and another has started leaving messages for his supervisor when that person is not available. Finally, a worker indicated that he could now more accurately order parts.

CASE STUDY SUMMARY: The firm offers literacy tutoring, including release time to workers who volunteer to participate. The company's motivation is not production related but simply to help the employees. The CEO said, "It is people here helping other people here." Interestingly, participating workers cited ways that their improved reading and writing skills enhanced job performance, even though this did not seem to be a management objective.

INDUSTRY (SIC):	Public Building and Related Furniture (254)
PROGRAM:	Yes
LOCATION:	Grand Rapids MSA
EMPLOYMENT SIZE:	200 at site visited; 50 and 150 at two other locations
DATE(S) OF SITE VISIT:	May 21, 1991 and November 19, 1991

HISTORY OF PROGRAM: Program launched between first and second visits by a state grant of $80K. Motivation was to systematically train the workforce because of stiffer competition. An analysis of the various work tasks had revealed that some senior workers and high school graduates had serious deficiencies in basic math and literacy. Recent financial pressures have forced discontinuance of the program, at least temporarily.

CHANGE EVENTS/RESTRUCTURING: Transition from "job-shop" to full production operation.

PROCESS FOR ASSESSMENT OF WORKERS: Workers who signed up for the program were assessed in mathematics.

GENERAL DESCRIPTION OF PROGRAM: Instruction is offered in basic math with emphasis on measurement, a skill needed on the job. Another class in business writing is offered. Two self- improvement seminars, "Working Parents" and "Managing Your Money," are also offered for a $10 fee and on workers own time.

PROVIDER TYPE: Local public school community education division.

SUBJECT(S): Basic math, business writing, and for a fee, "Working Parents" and "Managing Your Money."

INSTRUCTION TYPE: Classroom, group oriented, highly interactive.

NUMBER OF PARTICIPANTS: Twenty-six in initial seminar and 46 divided into 8 groups in first cycle.

RELEASE TIME: Full release time is given, and classes are scheduled to fit needs of all workshifts.

EVIDENCE OF IMPACT: Math participants felt they learned a lot and appreciated the opportunity, but did not think much of the material was applicable to their jobs. Business writing participants found the instruction useful at the workplace as well in their private lives. Half of the business writing participants were office workers. Supervisors were reportedly unenthusiastic about workers leaving their work station to attend class. The firm noticed an improvement in morale and better relations between workers and management.

There are signs that some new skills are being used on the job, but gains are expected to be gradual.

CASE STUDY SUMMARY: The program was started with a state subsidy, and was well organized and enthusiastically received by the workers; much more so than most other case study firms. But business pressures forced its demise and resumption is uncertain. All publicity and communication about the program assiduously avoided "school jargon"; classes were seminars; students were participants; courses were series. This was a key factor, according to training director.

INDUSTRY (SIC):	Public Building and Related Furniture (253)
PROGRAM:	Yes
LOCATION:	Kalamazoo MSA
EMPLOYMENT SIZE:	247
DATE(S) OF SITE VISIT:	October 1, 1991

HISTORY OF PROGRAM: Began as a result of quality meetings addressing the problem of parts not being made to blueprint specifications and resulting in costly scrap and rework. Had been progressing for one year prior to site visit. The program was completely funded by the company.

CHANGE EVENTS/RESTRUCTURING: Recent change in company ownership.

PROCESS FOR ASSESSMENT OF WORKERS: Workers pretested in mathematics. Pretest revealed literacy deficiencies as well (25%)

GENERAL DESCRIPTION OF PROGRAM: The course was created by condensing the key elements of a 16-week blueprint reading course into 16 hours. Customized by close coordination between the firm and the provider. The firm's blueprints and parts are used as examples in class.

PROVIDER TYPE: Community college.

SUBJECT(S): Industrial blueprint reading and basic shop math.

INSTRUCTION TYPE: Classroom style, group oriented, and highly interactive.

NUMBER OF PARTICIPANTS: Each class limited to 11 workers. At time of site visit, 3 classes had been completed.

RELEASE TIME: Provided as an extended work day. Participants are paid straight time for time spent in class.

EVIDENCE OF IMPACT: Instructor felt all participants benefit to some degree. Some were motivated to seek more training on their own, and attitude and work performance showed improvement. Company observed significant improvement in company loyalty and morale, in error rate reduction, and ability to use new technologies.

CASE STUDY SUMMARY: Blueprint reading and basic shop math training. Mandatory for some workers, voluntary for others. Outcome regarded as beneficial to company and workers, and plans are to continue. Detected literacy deficiencies addressed by instructors through individualized attention, e.g., one participant given oral pre- and post-test.

INDUSTRY (SIC):	Plastics Products (3089)
PROGRAM:	Yes
LOCATION:	Suburban Detroit
EMPLOYMENT SIZE:	425 (at 4 locations)
DATE(S) OF SITE VISIT:	May 17, 1991

HISTORY OF THE PROGRAM: The program was instituted simultaneously with (although not necessarily because of) major restructuring into self-managed teams and TQM approach. The company received a $50K subsidy from the state and had put together a curriculum that combined job-related training and basic skills, although much more emphasis on the former. The training was in early stages at the time of the site visit.

CHANGE EVENTS/RESTRUCTURING: The firm is an automotive supplier and very strongly feels that its future viability depends on higher workforce productivity to be achieved through synchronous manufacturing and self-managed teams. Implementation of a "pay for skills" program.

PROCESS FOR ASSESSMENT OF WORKERS: The program is operated in conjunction with a community college that assessed all workers but did not share the results of the assessment with the company.

GENERAL DESCRIPTION OF THE PROGRAM: The program was a formal sequence of courses covering technical, job-related subjects. Basic skills training was provided as needed to enable an understanding of the subject. For example, most workers needed math "brush-up" as a prerequisite to SPC training. This was provided formally as part of the SPC course. Additional basic skills development was done by co-workers in a tutoring mode.

PROVIDER TYPE: Community college.

SUBJECT(S): Math, problem solving, reading (as needed).

INSTRUCTION TYPE: On-site classes that were highly interactive; all participants required to work on group projects.

NUMBER OF PARTICIPANTS: All production workers take at least some of the classes; e.g., SPC.

RELEASE TIME: For on-site classes (one-two hours per week); no release time for preparation outside of class, individual tutoring, or classes taken at the community college.

EVIDENCE OF IMPACT: Management has observed better team performance and improved interpersonal behavior. Supervisors also cited improved interpersonal skills, but also noted less turnover and more worker promotions. Employees were generally negative about the training; complaining that only a

few workers would benefit from the technical training, SPC was done by the quality control staff, and the "pay for skills" program was inequitable.

CASE STUDY SUMMARY: This firm had fully subscribed to team production and synchronous manufacturing techniques and was making major strides toward their adoption. However, it was difficult to see how the job-related and basic skills training and the "pay for skills" program would supplement these activities. It was not clear that the firm's management had a clear vision of how they fit together either; they were learning by doing. The state subsidy was instrumental in involving all workers, and considerably less training would have been undertaken without it.

INDUSTRY (SIC):	Plastics Products (3089)
PROGRAM:	Yes
LOCATION:	Grand Rapids MSA
EMPLOYMENT SIZE:	396
DATE(S) OF SITE VISIT:	September 5, 1991

HISTORY OF THE PROGRAM: The corporation's CEO heard a presentation on problem solving and then delved into the literature. As a result, all employees now take a problem-solving seminar. The program has been in existence for approximately six years in response to the firm's efforts to meet and exceed customers' demands for quality and to support restructuring to self-managed work teams.

CHANGE EVENTS/RESTRUCTURING: Growth, quality improvement demands by automotive customers, and restructuring to self-managed work teams. Management wants to eliminate middle management and supervision as a "waste."

PROCESS FOR ASSESSMENT OF WORKERS: Program is mandatory for all workers, and their eligibility for a bonus hinges on completing the program.

GENERAL DESCRIPTION OF PROGRAM: The program consists mainly of a class in basic problem solving. Pre- and post-tests are given. The firm budgets annually $1000 per employee for training and has encouraged the use of those funds to support literacy tutoring for a very few workers (2 or 3).

PROVIDER TYPE: Internal—the problem-solving course is designed and taught by company employees. Literacy tutoring is provided by outside tutors paid by the company.

SUBJECT(S): Basic problem solving and literacy tutoring.

INSTRUCTION TYPE: Classroom, group oriented, and highly interactive.

NUMBER OF PARTICIPANTS: An estimated 750–800 people have taken the problem solving course since its inception. There are 10–20 people in each class, and 8 classes are taught per cycle in order to cover all shifts.

RELEASE TIME: Full release time is provided—2 hours twice a week for 4 weeks to complete a basic problem solving course. Release time is also offered for literacy tutoring.

EVIDENCE OF IMPACT: Pre- and post-tests in the problem-solving course indicate a typical improvement of 41 percent. Some workers felt the problem solving was not of much direct benefit to their jobs, but supervisors reported moderate to significant improvement in workers' ability to communi-

cate, get along with each other, work as teams, and produce quality work with greater efficiency. Management detected improvements in the quality of teamwork and output. The employees involved in the literacy tutoring had mixed reactions; they felt they were improving their reading skills but didn't feel they had the support of the company.

CASE STUDY SUMMARY: The firm trains all workers in basic problem solving to give them the background for team problem solving and prepare them for restructuring into self-managed work teams. The focus is on growth, improved quality, and improved productivity. To a much lesser degree, literacy tutoring is offered to those workers who need and want it. The literacy tutoring is offered in the belief that it leads to better employees and indirectly helps company loyalty and reduces turnover. The firm training budget of $1000 per employee per year was highly unusual, and furthermore the company gave employees considerable discretion in how the money was spent.

INDUSTRY (SIC):	Plastics Products (3089)
PROGRAM:	No
LOCATION:	Suburban Detroit
EMPLOYMENT SIZE:	150 at site visited, and 100 at another site
DATE(S) OF SITE VISIT:	August 15, 1991

WHY NO PROGRAM: The firm prefers to hire low-skill production workers and train them to do the job, rather than paying high wages for skills or training for non-job-related skills. Basic skills deficiencies are not a problem for this firm. If they are a problem with a particular worker, that worker is fired or shifted to a less demanding job. No changes are foreseen that will raise basic skills issues.

CHANGE EVENTS/RESTRUCTURING: The firm has implemented SPC to satisfy automotive customers, but basic skills deficiencies were not a barrier to training workers in SPC techniques.

CASE STUDY SUMMARY: The firm does not offer any basic skills training and does not plan to do so. They have not found basic skills deficiencies to be a handicap. They are satisfied with the low-skill/low-wage workers they hire and train to do production jobs.

INDUSTRY (SIC):	Fabricated Metal Products (3462)
PROGRAM:	Yes
LOCATION:	Jackson MSA
EMPLOYMENT SIZE:	221
DATE(S) OF SITE VISIT:	June 5, 1991

HISTORY OF THE PROGRAM: The program began two years before the site visit. In response to demands for increased quality and the introduction of SPC, the firm decided to upgrade the workforce and provide basic skills training. Assistance from a community college and a state grant of $72K made it possible.

CHANGE EVENTS/RESTRUCTURING: Introduction of SPC and TQM

PROCESS FOR ASSESSMENT OF WORKERS: All employees were tested using MESA (Microcomputer Evaluation and Screening Assessment) by the community college staff.

GENERAL DESCRIPTION OF PROGRAM: Designed to meet the needs of the firm based on assessment results and consultation with management. All workers below a certain assessment level required to take the training; others could volunteer. Classes at the work site.

PROVIDER TYPE: Community college.

SUBJECT(S): Shop math and reading.

INSTRUCTION TYPE: Classroom, group-oriented with individual attention. Highly interactive.

NUMBER OF PARTICIPANTS: 60 in shop math; 20 per class cycle.

RELEASE TIME: 100 percent at base pay rate. Some workers resentful of time away from job because on the job they can earn a piece rate bonus.

EVIDENCE OF IMPACT: Supervision noted improved ability to use SPC. Management liked to use the assessment tool to screen new applicants. Employee reaction was mixed. Some felt their jobs were in jeopardy if they did not perform well in class.

CASE STUDY SUMMARY: The availability of a state grant and assistance by a community college motivated the firm to start the program. The firm wants to generally upgrade the skills of the workforce to gain a competitive edge. Impacts have been marginally positive. Hiring standards have been raised, and continuance of the program without the subsidy is doubtful.

INDUSTRY (SIC):	Fabricated Metal Products (3462)
PROGRAM:	No
LOCATION:	Suburban Detroit
EMPLOYMENT SIZE:	79
DATE(S) OF SITE VISIT:	July 2, 1991

WHY NO PROGRAM: The firm recognizes that some workers have basic skill deficiencies and that these are detrimental to operations, but they are not considered a serious enough problem to demand solution. The firm lacks a personnel infrastructure for dealing with these issues, and does not know how to go about arranging a training program.

CHANGE EVENTS/RESTRUCTURING: The firm has not experienced any recent changes and does not foresee any changes or restructuring that would create a need for basic skills training. SPC was incorporated a number of years ago with on-the-job tutoring for basic math.

CASE STUDY SUMMARY: This is a stable firm being successful with no dramatic growth or restructuring. While some workers could do a better job with improved basic skills, it is not a problem to the firm,and the firm does not see a need to offer any training.

INDUSTRY (SIC):	Miscellaneous Machinery, Except Electrical (359)
PROGRAM:	Yes
LOCATION:	Suburban Detroit
EMPLOYMENT SIZE:	75
DATE(S) OF SITE VISIT:	May 13, 1991 and December 9, 1991

HISTORY OF THE PROGRAM: Two years before the site visit, with the assistance of a county economic development group, the plant relocated and began a training program with a state grant of $25K. Prior to this, basic skills training was done in-house on an irregular schedule, but business expansion made this no longer possible.

CHANGE EVENTS/RESTRUCTURING: Plant relocation; acquisition of high-technology machinery.

PROCESS FOR ASSESSMENT OF WORKERS: All workers were assessed by a community college using an instrument called ASSET.

GENERAL DESCRIPTION OF PROGRAM: Based on the assessment, courses were provided in basic math, basic English, and reading. Additional job-related material is included in the overall program, and instruction is a combination of on-site classes, off-site classes, and home study. The firm covers some of the cost, particularly the English and reading classes, which were not included in the grant.

PROVIDER TYPE: Community college.

SUBJECT(S): Basic shop math, metrology, basic English, reading, basic machining, and advanced machining.

INSTRUCTION TYPE: Classroom and home study.

NUMBER OF PARTICIPANTS: 55 assessed; 18 finished shop math; 13 in metrology; and 6 finished reading.

RELEASE TIME: On-site class time, but not off-site class time or home study time.

EVIDENCE OF IMPACT: Workers reported that the math helps them and also off the job. They feel that because of the training, they can work more independently. Management has observed gains in individual workers but feels it is still too early to measure any improvement in productivity or profits.

CASE STUDY SUMMARY: The program started with aid of a county economic development group and a community college with a state grant. Basic math, English, and reading are included. The firm contributes to the cost by providing the literacy classes. All parties are pleased with the results, and plans are to continue, at company expense, after the grant expires.

INDUSTRY (SIC):	Miscellaneous Machinery, Except Electrical (359)
PROGRAM:	Yes
LOCATION:	Suburban Detroit
EMPLOYMENT SIZE:	99 at the site-visit plant; 70 and 70 at two other sites.
DATE(S) OF SITE VISIT:	July 10, 1991

HISTORY OF THE PROGRAM: A couple of years before the site visit, the firm recognized a need for training and implemented a program through a community college and a state grant. Earlier, such needs were addressed through in-house training, but at this time the firm was too busy with other concerns to spend time on training, and assistance was available.

CHANGE EVENTS/RESTRUCTURING: Recent transition from job-shop to high volume production. Introduction of new high technology machine tools.

PROCESS FOR ASSESSMENT OF WORKERS: Needs assessment for shop math done by a community college.

GENERAL DESCRIPTION OF PROGRAM: Participation was voluntary. Courses were taught at a training facility near the workplace. Classes were 2 hours long and scheduled at shift change time so both shifts could participate.

PROVIDER TYPE: Community college.

SUBJECT(S): Basic shop math, shop theory, basic machining, and geometric tolerances.

INSTRUCTION TYPE: Classroom, group oriented and highly interactive.

NUMBER OF PARTICIPANTS: 35 completed the program.

RELEASE TIME: 50%; one hour paid release time and one hour contributed by the employee once a week.

EVIDENCE OF IMPACT: Some employees felt they benefited a lot, others not so much, depending on experience and tenure with the company. Employee satisfaction was generally low. They work a lot of overtime and the training seemed an extra burden. Supervisors observed significant improvements in morale, error rates, quality, and safety. Management noticed improvement in blueprint reading; none in error rates.

CASE STUDY SUMMARY: The program was designed by a community college and supported by a state subsidy. Implementation was rushed and not widely supported by management and supervision. The firm was extremely busy and had to rush to complete program before funding expired. Impact was marginal, and future similar programs without subsidy doubtful.

INDUSTRY (SIC):	Miscellaneous Machinery, Except Electrical (359)
PROGRAM:	No
LOCATION:	Suburban Detroit
EMPLOYMENT SIZE:	106
DATE(S) OF SITE VISIT:	July 12, 1991

WHY NO PROGRAM: The firm hires low-skill, low-cost labor and trains to do the job. There is very high turnover among entry level workers. Management feels that reading and English language deficiencies are a serious problem for the firm, but the cost, particularly in release time is too high. Turnover and lack of training infrastructure are also deterrents.

CHANGE EVENTS/RESTRUCTURING: Expanding markets and sales; new technology; and teamwork concepts, introduced 3 years ago.

CASE STUDY SUMMARY: The firm does not offer basic skills training although there are some problems attributable to basic skills deficiencies. A course in reading and math was investigated recently, and management decided it was not feasible because of release time cost, turnover, and lack of personnel infrastructure.

INDUSTRY (SIC):	Electric Lighting and Wiring Equipment (364)
PROGRAM:	Yes
LOCATION:	Battle Creek MSA
EMPLOYMENT SIZE:	325
DATE(S) OF SITE VISIT:	September 4, 1991

HISTORY OF THE PROGRAM: The firm started up the site visit plant in 1987, and the production workforce was staffed through the assistance of a community economic development program. All applicants receive prehire training that includes basic skills.

CHANGE EVENTS/RESTRUCTURING: Start up of new plant.

PROCESS FOR ASSESSMENT OF WORKERS: All potential applicants given assessment of basic skills (with TABE).

GENERAL DESCRIPTION OF PROGRAM: All entry production workers were and continue to be hired from a pool of temporary workers who have received 48 hours of pre-hire training in skills including basic skills. Those who score below 8th-grade level in the basic skills assessment are trained with PLATO. After hire, training continues with 40 hours of basic job orientation training during the first two weeks of employment.

PROVIDER TYPE: Combination of community economic development organization, local community college, and a local vocational school.

SUBJECT(S): Shop math and communications in addition to general job-related subjects.

INSTRUCTION TYPE: Some basic skills through a computerized instructional system called PLATO. Other training is in a classroom.

NUMBER OF PARTICIPANTS: 236 since inception of the program; normally 30 per cycle.

RELEASE TIME: None for the pre-hire training; 100% for the post-hire 40 hours of training (although this is mostly job-specific).

EVIDENCE OF IMPACT: The pre-hire training was touted by management as an excellent screening device for hiring production workers. Workers reported gains in self-confidence and thought the training has value as an introduction to the company, although they felt much of the training was not particularly useful on the job.

CASE STUDY SUMMARY: All applicants for production jobs at this new plant must receive prehire training that includes basic skills and basic skills remediation. Completing the training is no guarantee of being hired. The program effectively screens out low-skilled applicants. The future of the program is uncertain because community economic development subsidies are being discontinued.

INDUSTRY (SIC):	Electric Lighting and Wiring Equipment (364)
PROGRAM:	No
LOCATION:	Battle Creek MSA
EMPLOYMENT SIZE:	398
DATE(S) OF SITE VISIT:	October 2, 1991

WHY NO PROGRAM: Entry-level workers lacking the basic skill prerequisites for on-the-job and job-specific training are simply not hired. Workers are hired from a pool of temporary workers who have already been trained on the job and already had their job performance evaluated. Furthermore, high school completion or GED is a requirement for hiring.

CHANGE EVENTS/RESTRUCTURING: This firm was established in 1985, incorporating modern production techniques, SPC, and work-team organization. No restructuring is foreseen.

CASE STUDY SUMMARY: This relatively new firm was organized at the outset with a modern production structure and has not experienced any changes nor does it expect to. The workforce was hired with all the basic skills needed by the firm, and so far there has been no shortage of adequately skilled workers. Hence the firm does not need any basic skills training and does not expect to need any in the near future.

INDUSTRY (SIC):	Electric Lighting and Wiring Equipment (364)
PROGRAM:	No
LOCATION:	Kalamazoo MSA
EMPLOYMENT SIZE:	302 at site-visit plant; 80 at another site
DATE(S) OF SITE VISIT:	July 23, 1991

WHY NO PROGRAM: Cost, lack of infrastructure, and the belief by management that workers are responsible for solving their own problems.

CHANGE EVENTS/RESTRUCTURING: Management change within last couple of years. Implementation of a TQM-type program. Production workers receive considerable cross-training that is formalized and used in determining promotions.

CASE STUDY SUMMARY: This firm recognizes that some workers are deficient in basic skills but does not feel it is the responsibility of the company to provide the training. Workers are encouraged to improve their skills and keep up-to-date, but they have to improve their basic skills on their own through a tuition reimbursement program.

INDUSTRY (SIC):	Hotels, Motels, and Tourist Courts (701)
PROGRAM:	No
LOCATION:	Northern Lower Peninsula
EMPLOYMENT SIZE:	Firm owns 2 hotels and 3 restaurants with a total of 475 employees (which includes 100–120 core, year-round staff; 80 full-year part-timers; and 300 seasonal part-timers)
DATE(S) OF SITE VISIT:	May 29, 1991

WHY NO PROGRAM: The company does not perceive a need for it and is engaged in a highly competitive industry characterized by low wages, low benefits, and high turnover. Basic skills training would be an unnecessary expense.

CHANGE EVENTS/RESTRUCTURING: None.

CASE STUDY SUMMARY: The management indicated that most nonmanagerial occupations were unskilled and had high turnover. Communications skills were important in many of the positions, but the individuals were screened on this at time of hire, and there were excess applicants to choose from.

The firm held the educational system in high esteem, and felt that basic skills deficiencies were the natural consequence of variation in peoples' abilities. The firm views itself as benefiting individuals with low basic skills by providing them with employment.

INDUSTRY (SIC):	Hotels, Motels, and Tourist Courts (701)
PROGRAM:	No
LOCATION:	Northern Lower Peninsula
EMPLOYMENT SIZE:	200
DATE(S) OF SITE VISIT:	August 12, 1991

WHY NO PROGRAM: This hotel was originally built in the 1930s, but recently underwent a total refurbishing. The management had planned to provide considerable basic skills training, but the time pressure to reopen the facility during tourist season precluded the training. Furthermore, the management felt that the workers did not need basic skills training, the firm did not have the personnel infrastructure to deal with it, and the firm could not afford the costs.

CHANGE EVENTS/RESTRUCTURING: A new owner, who had completely refurbished the hotel during the year prior to the site visit; some automation of jobs.

CASE STUDY SUMMARY: A first-class, year-round hotel whose new managers realized the importance of customer relations, so the communications skills of all employees were of concern. Communications skills were screened at the time of hiring, and a 4-hour training session on communications and customer relations was given to all employees.

INDUSTRY (SIC):	Hotels, Motels, and Tourist Courts (701)
PROGRAM:	No
LOCATION:	Northern Lower Peninsula
EMPLOYMENT SIZE:	15
DATE(S) OF SITE VISIT:	August 13, 1991

WHY NO PROGRAM: The enterprise that owned and operated this small motel found it could require a high school diploma or equivalent and fully staff it operations. Basic skills training was seen as unnecessary for its current employees.

CHANGE EVENTS/RESTRUCTURING: None.

CASE STUDY SUMMARY: The area where this motel was located had a considerable unemployed labor force to draw from, so the motel could easily screen out low-skilled individuals, and chose to do so.

INDUSTRY (SIC):	Hospitals (8062)
PROGRAM:	Yes
LOCATION:	South Central
EMPLOYMENT SIZE:	607
DATE(S) OF SITE VISIT:	June 18, 1991

HISTORY OF THE PROGRAM: Mandatory training in workplace safety revealed that some workers had reading deficiencies and could not read warning labels on containers of hazardous materials. Secondly, workers expressed the desire to become more self-sufficient in their jobs so they could work with less supervision. On a volunteer basis, the workers are encouraged to participate in literacy training.

CHANGE EVENTS/RESTRUCTURING: Recent years have brought major management changes and increased competition.

PROCESS FOR ASSESSMENT OF WORKERS: No formal assessment.

GENERAL DESCRIPTION OF PROGRAM: Workers are encouraged on a volunteer basis to participate in Adult Basic Education courses at the local Adult Education facility. The firm cooperated by adjusting work schedules and allowing changes in hours to avoid conflicts with class schedules.

PROVIDER TYPE: Local public schools adult education program.

SUBJECT(S): Adult Basic Education, including reading, writing, math, and for some individuals, ESL.

INSTRUCTION TYPE: Classroom with individual attention as required by student.

NUMBER OF PARTICIPANTS: 4 currently.

RELEASE TIME: None.

EVIDENCE OF IMPACT: Both workers and their supervisors felt that those participating in the program are now able to do their jobs with less supervision.

CASE STUDY SUMMARY: Workers identified as having deficiencies in reading and English language skills were encouraged on a voluntary basis to participate in the local school Adult Basic Education program. The firm contributes by giving encouragement, support, and adjusting work schedules to fit class schedules. The training costs are covered by federal funds for ABE. There is virtually no cost to the firm. The few workers participating and the firm are benefiting because the workers are able to work more independently.

INDUSTRY (SIC): Hospitals (8062)

PROGRAM: No

LOCATION: Kalamazoo MSA

EMPLOYMENT SIZE: 300

DATE(S) OF SITE VISIT: June 27, 1991

WHY NO PROGRAM: Management, supervisors, and workers all indicated that they felt there were deficiencies in basic skills, but cost for release time, turnover, and lack of training infrastructure were all cited as reasons why training is not offered. The present level of functioning in the departments where deficiencies exist is perceived to be adequate, and no foreseeable changes will raise basic skills issues.

CHANGE EVENTS/RESTRUCTURING: There was significant downsizing recently, and the firm is embarking on a major facility expansion and upgrade program.

CASE STUDY SUMMARY: While basic skills deficiencies among some workers are recognized as an area needing improvement, the need is not great enough now to warrant the cost of a training program or even serious investigation into what the cost would be.

INDUSTRY (SIC):	Hospitals (8062)
PROGRAM:	No
LOCATION:	South Central
EMPLOYMENT SIZE:	59; 39 full-time equivalent
DATE(S) OF SITE VISIT:	September 11, 1991

WHY NO PROGRAM: The firm does not perceive a need for any basic skills training; secondarily, it is involved in a tough financial struggle to survive, and such training is an unnecessary expense.

CHANGE EVENTS/RESTRUCTURING: The firm is in a struggle for survival. There has been a recent change in management and reduction of workforce.

CASE STUDY SUMMARY: This firm does not believe it has a need for any basic skills training, and furthermore its financial condition now is too tenuous to even consider any cost not absolutely necessary.

INDUSTRY (SIC):	Hospitals (8062)
PROGRAM:	No
LOCATION:	South Central
EMPLOYMENT SIZE:	750; 630 full-time equivalent
DATE(S) OF SITE VISIT:	September 27, 1991

WHY NO PROGRAM: The firm is satisfied with the level of basic skills and does not see a need for this kind of training. The firm recently surveyed management about worker skills (not an assessment of workers) and concluded that training was not necessary. Slight problems with workers' ability to read, write, orally communicate, work together as a team, and solve work-related problems were perceived by the respondents, but not to the degree of seriously handicapping their work performance. For entry level workers, work ethics is considered a more serious deficiency than basic skills.

CHANGE EVENTS/RESTRUCTURING: Major growth, and recent adoption of Total Quality Management (TQM).

CASE STUDY SUMMARY: The firm has looked into the need for basic skills training of its staff and is satisfied with the conclusion that although there is room for improvement, the training is not needed.

Firms Participating in Phase II Case Studies

INDUSTRY (SIC):	Plastics Products (3089)
PROGRAM:	Yes
LOCATION:	Flint MSA
EMPLOYMENT SIZE:	187
DATE(S) OF SITE VISIT:	April 23, 1992

HISTORY OF THE PROGRAM: The firm joined an educational partnership with other firms and a community college using federal funds on a 10 percent co-pay basis to provide skills training to workers. Workers from this firm began the training in October 1991. Training is continuing now, but federal funds will be discontinued in October 1992, and the future of the program is uncertain.

CHANGE EVENTS/RESTRUCTURING: Expanded plant, advanced technology, just-in-time shipments.

PROCESS FOR ASSESSMENT OF WORKERS: College placement tests: Nelson-Denny reading test, a writing sample, and a departmental math test.

GENERAL DESCRIPTION OF PROGRAM: Classes meet for 10 weeks and include 45 hours of instruction. Classes are held at a central location for workers from several partner companies. Computers are used heavily in math, reading, and writing classes. Achievement standards are set, and those who do not reach standard level may repeat if they wish. Classes are scheduled in early morning and late afternoon to serve all 3 shifts. Some workers received special encouragement to participate, but the program is open to all workers on a voluntary basis.

PROVIDER TYPE: Community college.

SUBJECT(S): Basic math, reading, writing, problem solving, communications, and human relations.

INSTRUCTION TYPE: Classroom, computerized instruction, each class customized by the instructor to the needs and abilities of the class members.

NUMBER OF PARTICIPANTS: 31 total; typically 10–12 per class cycle.

RELEASE TIME: 50 percent plus participants are reimbursed at 50 percent wage rate for their own contributed time.

EVIDENCE OF IMPACT: Supervision observed that workers are more open and more inclined to ask questions about their work. A payroll clerk noted that errors in time cards are less frequent. Management has noted improvement

in ability to communicate, company loyalty, and morale. Also error rates are lower, and workers seem better able to handle new technology.

CASE STUDY SUMMARY: The firm entered the program upon contact by a community college and entered a partnership with the college and other firms for worker education. The firm contributes 10 percent of the cost with the balance federally funded. Those workers who volunteered to participate have made positive gains. The expiration of the federal funding makes future basic skills training uncertain.

INDUSTRY (SIC):	Educational Services (8221)
PROGRAM:	Yes
LOCATION:	Detroit MSA
EMPLOYMENT SIZE:	22,000
DATE(S) OF SITE VISIT:	April 28, 1992 and May 21, 1992

HISTORY OF THE PROGRAM: The program was begun in the mid 1970s to address the needs of workers lacking high school diplomas. It is strictly voluntary. Participation has had ups and downs and is currently at a low ebb. Due to decentralized management of the institution's departments, support and encouragement of participation has varied with changes in individual managers.

CHANGE EVENTS/RESTRUCTURING: Budget cutbacks and implementation of Total Quality Management (TQM) in some departments.

PROCESS FOR ASSESSMENT OF WORKERS: Any worker lacking high school diploma is eligible.

GENERAL DESCRIPTION OF PROGRAM: Instructional material is primarily focused on Adult Basic Education (ABE) and preparation for the General Education Development (GED) tests. Classes are for two hours, twice a week, and are customized to the needs of the participants in each class. The program is funded by federal money available for ABE and GED education, and in a small degree by the institution in release time and providing classroom facilities.

PROVIDER TYPE: Public school community education department.

SUBJECT(S): Reading, writing, English language, basic math, and other ABE and GED requirements.

INSTRUCTION TYPE: Classroom, with individualized attention; highly interactive, and self-paced.

NUMBER OF PARTICIPANTS: Has ranged from 150 to 6 per year.

RELEASE TIME: Varies with policy of participants' department head. Estimated that 80 percent of participants received release time early in program; but is now estimated to be 20 percent. Some departments offer 100 percent release time, others none.

EVIDENCE OF IMPACT: Managers and supervisors reported gains in reading, communication, morale, attitude, ability to work together, and reduction of error rates. Other observers and participants saw large improvement in self-esteem. Adults who had had conflicts with schools and education at an early age discovered new abilities.

CASE STUDY SUMMARY: In a large institution, the program serves the needs of those workers who lack a high school diploma. Education is available at the workplace in ABE and GED at no cost to the worker except their time in some cases. The program is flexible and attempts to meet individual needs. Participants are enthusiastic, and there are many anecdotes of improved job-performance and changed lives resulting from the program.

INDUSTRY (SIC):	Transportation Equipment (3714)
PROGRAM:	Yes
LOCATION:	Detroit MSA
EMPLOYMENT SIZE:	1122 union members at one location that was visited
DATE(S) OF SITE VISIT:	June 1–2, 1992

HISTORY OF THE PROGRAM: Inaugurated jointly by union and company in early 1980s as the result of collective bargaining negotiations. Initially intended to retrain displaced workers, the program expanded to cover numerous benefits, including a skills enhancement program. Funded by $.15 total from each labor hour worked, with $.10 funding a national center, and $.05 funding the local program at each plant.

CHANGE EVENTS/RESTRUCTURING: New technology, increased emphasis on quality, and restructuring to work teams and employee involvement.

PROCESS FOR ASSESSMENT OF WORKERS: Various, depending on specific plant location and need being addressed.

GENERAL DESCRIPTION OF PROGRAM: The national center contracts with a local provider to conduct the skills enhancement program at each local plant. Local guidance and control is provided by a local joint union-company committee. Program active in approximately 60 plants nationwide. Subject matter for the program is wide open, depending on desires and needs of the workers and approval of the local joint committee. Focus is on education rather than training, and the subject material is only loosely job-related or not related at all. Confidentiality of individual participation is a key element of program.

PROVIDER TYPE: Local public schools, community college, or university.

SUBJECT(S): Widely ranged from basic literacy, GED or high school completion, or shop math, to foreign language or creative writing.

INSTRUCTION TYPE: Both classroom and one-on-one tutoring. Individualized instruction widely used.

NUMBER OF PARTICIPANTS: At example plant visited: 150–180 per year; approximately 1000 since inception (includes repeated participation—not a count of individuals).

RELEASE TIME: None.

EVIDENCE OF IMPACT: There is much anecdotal evidence of beneficial impacts. There is no attempt to relate program to productivity or profits.

CASE STUDY SUMMARY: This is a large program operated jointly by the company and union providing skills enhancement education for hourly workers in approximately 60 plants. The program is funded by $.15 per labor hour worked, a negotiable figure. There is a great deal of flexibility with specific subjects covered determined by workers' need and desires, approved by local plant joint union-company committee. Instruction is largely individual and self-paced with confidentiality of individual participation preserved.

INDUSTRY (SIC):	Business Services (7389)
PROGRAM:	Yes
LOCATION:	Flint MSA
EMPLOYMENT SIZE:	70 permanent plus up to an average of 25 temporary workers.
DATE(S) OF SITE VISIT:	June 10, 1992

HISTORY OF THE PROGRAM: The firm joined an educational partnership with other firms and a community college using federal funds on a 10 percent co-pay basis to provide skills training to workers. Workers from this firm began the training in February 1992. Training is continuing now, but federal funds will be discontinued in October 1992, and the future of the program is uncertain.

CHANGE EVENTS/RESTRUCTURING: Change of ownership 5 years ago, quintupling growth, plant expansion, planning restructure to self-directed work teams.

PROCESS FOR ASSESSMENT OF WORKERS: College placement tests: Nelson-Denny reading test, a writing sample, and a departmental math test.

GENERAL DESCRIPTION OF PROGRAM: Classes meet for 10 weeks and include 45 hours of instruction. Classes are held at a central location for workers from several partner companies. Computers are used heavily in math, reading, and writing classes. Achievement standards are set, and those who do not reach standard level may repeat if they wish. Certain workers were singled out for special encouragement to participate because it was felt that their job performance would be enhance by skills development.

PROVIDER TYPE: Community college.

SUBJECT(S): Basic math, reading, writing, problem solving, communications, and human relations.

INSTRUCTION TYPE: Classroom, computerized instruction, each class customized by the instructor to the needs and abilities of the class members.

NUMBER OF PARTICIPANTS: 6 from this firm.

RELEASE TIME: 100%.

EVIDENCE OF IMPACT: Supervision observed moderate improvements in reading, computation, communications, reduction in error rates, and noticeably improved morale, loyalty, and worker-management relations. Management noted significant impacts in communication, computation, problem solving, and morale.

CASE STUDY SUMMARY: The firm entered the program upon contact by a community college and entered a partnership with the college and other firms for worker education. The firm contributes 10 percent of the cost with the balance federally funded. A select group of workers volunteered to participate and have made positive gains. The expiration of the federal funding makes future basic skills training uncertain

INDUSTRY (SIC):	Chemicals and Allied Products (2899)
PROGRAM:	Yes
LOCATION:	Suburban Detroit
EMPLOYMENT SIZE:	59 permanent employees plus 20–200 temporary workers.
DATE(S) OF SITE VISIT:	June 23, 1992

HISTORY OF THE PROGRAM: Began in early 1992 after the plant manager became aware of resources available from a community adult education facility. A learning center was established at the workplace that is staffed by an instructor from the community adult education unit.

CHANGE EVENTS/RESTRUCTURING: Technological changes; adoption of SPC; beginning restructuring to self-directed work teams.

PROCESS FOR ASSESSMENT OF WORKERS: All workers were assessed and interviewed initially, and those who volunteered to participate were assessed with TABE.

GENERAL DESCRIPTION OF PROGRAM: The on-site learning center is staffed by a certified adult ed teacher from 1 to 4 PM, four days a week. Classes follow the day shift and precede the afternoon shift. All workers are eligible, including temporaries. Funding is from the state for those lacking high school completion.

PROVIDER TYPE: Public schools adult education division.

SUBJECT(S): Reading, writing, basic math, and some ESL.

INSTRUCTION TYPE: Self-paced and highly interactive

NUMBER OF PARTICIPANTS: The program started with 25, but has dropped to 9 participants.

RELEASE TIME: None.

EVIDENCE OF IMPACT: Supervision reported improvement in worker attitudes and ability to perform on the job. Management reported that participants are tending to become the leaders in their work groups. Significant impacts were observed in improved communications and problem-solving skills. Notable, also, are improved company loyalty and morale, better relations between management and workers, and better teamwork.

CASE STUDY SUMMARY: The firm is making use of available community adult education resources to train workers in basic skills of math, reading, writing, and ESL. Training is voluntary and open to temporary workers as well as permanent employees. This is the only firm encountered that provided training to temporary, noncorporate staff. Significant gains have been observed by supervision and management. The program is likely to continue and expand, but initial decline in participation has been disappointing.

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